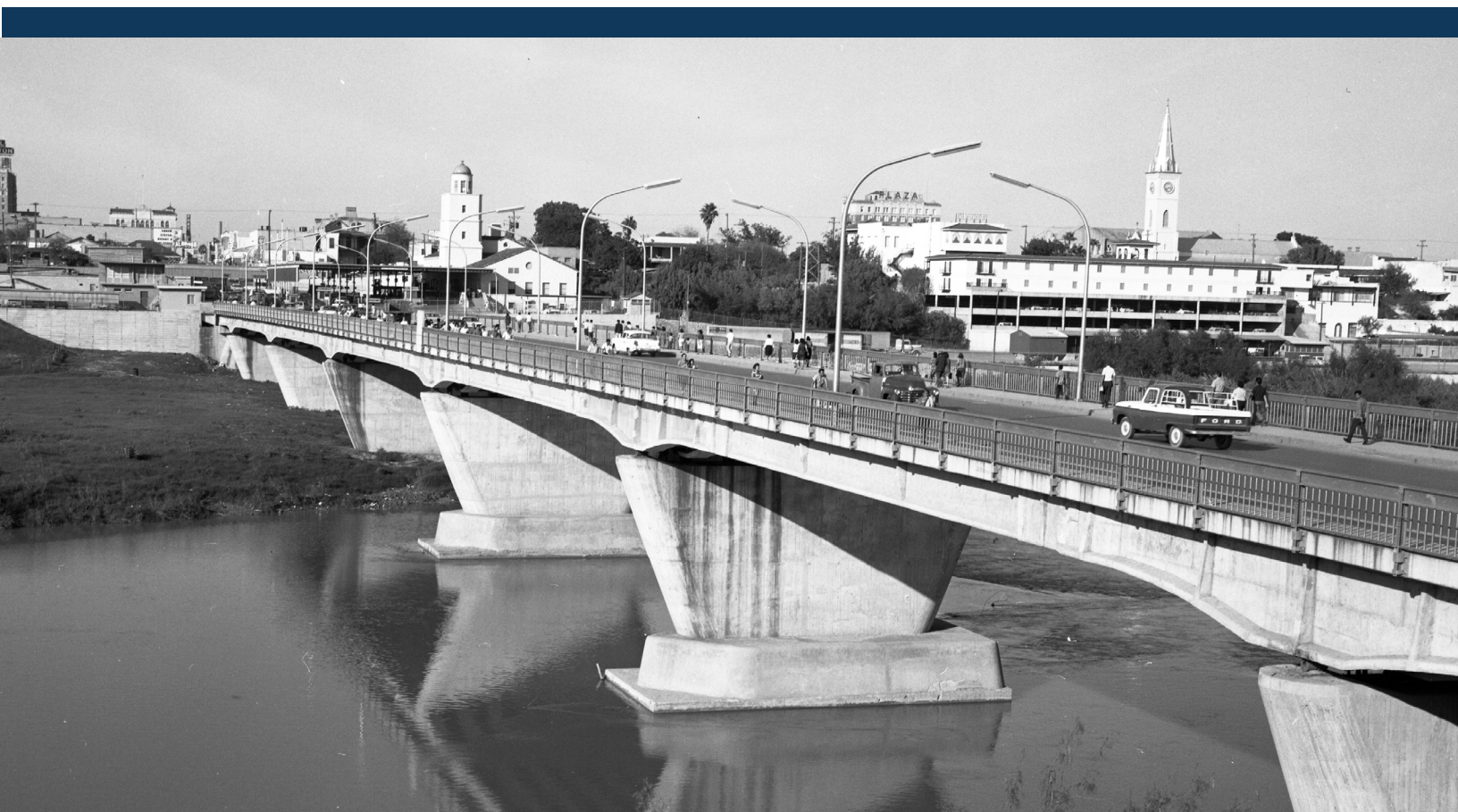




**ENVIRONMENTAL AFFAIRS  
DIVISION**

# Historic Bridge Section 4(f) Guidelines and Documentation Standards



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# Executive Summary

This technical report presents Guidelines and Documentation Standards for Historic Bridge Programmatic Section 4(f) Evaluations. Part 1 of this document includes the Historic Bridge Programmatic Section 4(f) Guidelines and instructions on how to complete the Section 4f Programmatic Evaluation of Historic Bridge Projects Checklist. Part 2 includes appendices that give additional information. Johnson, Mirmiran & Thompson, Inc. (JMT) prepared this report for the Texas Department of Transportation (TxDOT) under Work Authorization 57011SH003. This document is an update of the 2009 report that Mead & Hunt, Inc. (Mead & Hunt) prepared for TxDOT under Work Authorization 57805SH003.

Part 1 of this technical report provides guidance in preparing Historic Bridge Programmatic Section 4(f) Evaluation documentation pursuant to the provisions of Title 23, Code of Federal Regulations (CFR) Section 774. The Guidelines provide TxDOT district environmental staff, cultural resources management staff, and other non-

engineers with recommendations on gathering technical and engineering information for establishing a project's purpose and need as well as sufficient justification for the alternatives considered and measures to minimize harm. The Guidelines provide an overview of the Historic Bridge Programmatic Section 4(f) Evaluation, the recommended process for completing the Section 4f Programmatic Evaluation of Historic Bridge Projects Checklist, and the components required for inclusion in the checklist. Photographs, maps, and other visual aids are used to highlight information in the text and as examples of material recommended in the Programmatic Section 4(f) Evaluation.

Part 2 of this technical report includes appendices which contain the Documentation Standards for Historic Bridge Programmatic Section 4(f) evaluations, which are based on the Guidelines in Part 1. The Documentation Standards outline the information, graphics, maps, and photographs required for Historic Bridge Programmatic Section 4(f) Evaluations.

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## PART 1: HISTORIC BRIDGE PROGRAMMATIC SECTION 4(F) GUIDELINES

### Introduction

Section 4(f) of the US Department of Transportation Act of 1966 mandates that “special effort should be made to preserve ... historic sites” (49 United States Code 303). Historic bridges—those that are eligible for or listed in the National Register of Historic Places (NRHP)—are historic sites under this statute and are subject to Section 4(f) legal requirements. These Historic Bridge Programmatic Section 4(f) Guidelines (Guidelines) provide assistance in preparing Historic Bridge Programmatic Section 4(f) Evaluations (Programmatic Section 4(f) Evaluations) pursuant to the provisions of Title 23, Code of Federal Regulations (CFR) Section 774.

Programmatic Section 4(f) Evaluations document the engineering analyses and technical justifications used to determine if there is a feasible and prudent alternative to using a historic bridge. They also document that the selected alternative poses the least overall harm to the historic bridge after all possible planning to minimize harm has been incorporated into project planning efforts. Prepared by the Texas Department of Transportation (TxDOT), the Programmatic Section 4(f) Evaluation becomes part of the proposed project’s public record and is reviewed by engineers and non-engineers alike. TxDOT, under Federal Highway Administration (FHWA) National Environmental Policy Act (NEPA) assignment, has ultimate decision-making responsibility and approval of the alternatives analysis.

The Guidelines were developed for the TxDOT district environmental staff, cultural resources management staff, and other non-engineers who are typically the authors of the Programmatic Section 4(f) Evaluations. In the past, understanding what information to use and where to obtain it has been particularly challenging for those non-engineers tasked with completing Programmatic Section 4(f) Evaluations. The Guidelines provide tools to aid preparers in gathering the technical and engineering information used to justify the Programmatic Section 4(f) Evaluation’s conclusions. Recommendations for establishing a collaborative process to prepare the Programmatic Section 4(f) Evaluation are also provided. The collaborative process will assist in relaying technical and engineering information to the non-engineer lay readers.

Provided in a question-and-answer format, the Guidelines provide a brief overview of the Section 4(f) legal requirements for historic bridges, describe the recommended process for completing the Programmatic Section 4(f) Evaluations checklist, and outline the type of information that should be included in the Programmatic Section 4(f) Evaluation attachments.

## Section 4(f) Background

### What are historic bridges?

Historic bridges are bridges listed in or eligible for listing in the NRHP. There are two ways that TxDOT determines which bridges are eligible for listing in the NRHP—programmatic inventories and bridge-by-bridge evaluations. TxDOT conducts the programmatic inventories in accordance with Section 110 of the National Historic Preservation Act (NHPA). TxDOT has completed the following programmatic bridge inventories and historic context:

- Texas Historic Bridge Inventory, Survey of Non-Truss Structures (2001, undergoing update in 2021-2023)
- Texas Historic Bridge Inventory, Evaluation of 1945-1965 Bridges (2010)
- Statewide Vehicular Truss Bridge Reevaluation (2013)
- Historic Road Infrastructure of Texas, 1866-1965, Multiple Property Documentation Form, 2015

TxDOT also determines which bridges are eligible on a bridge-by-bridge basis through the NHPA Section 106 process. These determinations usually occur when TxDOT proposes that a bridge be rehabilitated or replaced. For more information regarding the Section 106 or Section 110 processes of the NHPA, please contact TxDOT's Environmental Affairs Division (ENV) Historical Studies staff.

Use this document to complete the Section 4f Programmatic Evaluation of Historic Bridge Projects Checklist.

### When does Section 4(f) apply to historic bridges?

Bridges listed or eligible for listing in the NRHP are historic sites as defined by the Section 4(f) regulations in 23 CFR 774.17. Section 4(f) applies when a project proposes a “use” of a historic bridge. A “use” occurs when the proposed project lessens the bridge’s historic integrity, as defined by the National Register of Historic Places. This happens when a project alters or destroys a historic bridge’s character-defining features, for example a bridge’s railings, masonry, or special design elements. Examples of projects that may lessen a bridge’s historic integrity include demolishing, replacing, or widening a bridge. In such cases, TxDOT must prepare a Programmatic Section 4(f) Evaluation.

### What is considered a “use” of a historic bridge?

The FHWA determined that a historic bridge is used when it is demolished or when the historic quality for which the resource was determined to be eligible for listing in the NRHP is adversely affected by the proposed improvement as determined through TxDOT’s consultation under NHPA Section 106 (Section 106) with the State Historic Preservation Officer (SHPO). When there is a Section 4(f) use of a bridge, TxDOT must prepare a Programmatic Section 4(f) Evaluation.

During the Section 106 process, TxDOT, in consultation with consulting parties, may decide that the proposed project does not affect the bridge’s historic qualities. In this case, there would be no Section 4(f) use of the bridge – meaning a Programmatic Section 4(f) Evaluation is not needed. For example, many restoration, rehabilitation, and maintenance activities do not alter the bridge’s historic characteristics and do not require a Programmatic Section 4(f) Evaluation.

For more information about how Section 106 consultation pertains to Section 4(f), see page 8 or ask ENV Historical Studies staff.

### What is the difference between an individual and Programmatic Section 4(f) Evaluation?

A Programmatic Section 4(f) Evaluation is a simplified and streamlined version of an individual Section 4(f) Evaluation. A Programmatic Section 4(f) Evaluation provides standard alternatives to consider, requires less coordination between agencies, and does not require a legal sufficiency review.

### What are the criteria for a Programmatic Section 4(f) Evaluation?

The Programmatic Section 4(f) Evaluation may be applied if a project meets the following criteria:

- Bridge is to be replaced or rehabilitated with FHWA funds
- Project requires the use of a historic bridge, which is listed in or eligible for listing in the NRHP
- Bridge is not a National Historic Landmark (NHL)
- In reviewing the Section 4(f) Evaluation, TxDOT agrees that the justifications and data set forth in the Alternatives, Findings, and Mitigation sections of the evaluation document are the same as the facts of the project
- Agreement between TxDOT and the SHPO about the historic bridge is reached through the NHPA Section 106 consultation process

## PART 1: HISTORIC BRIDGE PROGRAMMATIC SECTION 4(F) GUIDELINES

When a project does not meet one or more of these criteria, TxDOT must perform an Individual Section 4(f) Evaluation.

### Will Section 4(f) apply to a historic bridge that is left in place after a new bridge is constructed?

If a historic bridge is left in place, its historic integrity is maintained. In circumstances when a new bridge's proximity to the historic bridge does not adversely affect the historic bridge, Section 4(f) does not apply.



Denton County Historical Commission stands on the historic Elm Fork of the Trinity River Bridge. TxDOT bypassed this historic bridge, and it now serves as part of a hike and bike trail in North Texas.

In these situations, TxDOT requires a plan for continued maintenance to avoid harm to the historic bridge due to neglect. For off-system bridges, which are those bridges that are owned by counties or local jurisdictions, a two- or three-party agreement is usually undertaken to ensure continued maintenance on the

bypassed bridge. TxDOT must find responsible new owners for all types of historic bridges bypassed and left in place. New owners will be responsible for inspecting and maintaining the bypassed bridge.

### How do other laws pertain to the Section 4(f) requirements?

The Programmatic Section 4(f) Evaluation may occur concurrently with other legal requirements such as the National Environmental Policy Act (NEPA) and Section 106 of the NHPA. Coordination conducted under NHPA and NEPA often inform the development of the Programmatic Section 4(f) Evaluation document. FHWA designated TxDOT as its decision-maker for the majority of all NEPA, NHPA, and Section 4(f) documents on its projects in Texas.

When the use of a historic bridge is proposed, the NHPA Section 106 process and development of the Programmatic Section 4(f) Evaluation for a historic bridge are intertwined in many ways. First, the definition of “use” of a historic bridge depends upon the consultation with the SHPO under Section 106 of the NHPA. Second, most measures to minimize harm that are incorporated into the Programmatic Section 4(f) Evaluation are also included in Section 106 consultation. Third, Section 106 has public involvement requirements, and the results of the public involvement should be incorporated in the development of the Programmatic Section 4(f) Evaluation. Lastly, a Programmatic Section 4(f) Evaluation may only be approved when the SHPO agrees with the actions that are to be taken regarding the historic bridge.<sup>1</sup> While such agreement occurs under the Section 106 process, the information provided to the SHPO for Section 106 consultation comes directly from the Programmatic Section 4(f) Evaluation.

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1 “Programmatic Section 4(f) Evaluation and Approval for FHWA Projects that Necessitate the Use of Historic Bridges”

## PART 1: HISTORIC BRIDGE PROGRAMMATIC SECTION 4(F) GUIDELINES

Table 1: Links between NEPA, Section 106, and Section 4(f)

NEPA Steps	Section 106 Steps	Section 4(f) Steps
Define Purpose and Need		
Determine Scoping Thresholds		
Conduct Project Scope Review	<ol style="list-style-type: none"> <li>1. Determine if project has no potential to cause effects to historic properties.</li> <li>2. Determine if project has minimal potential to cause effects to historic properties.</li> <li>3. If neither 1 or 2, prepare Archeological Background Study (ABS) and/or Project Coordination Request for historical resources.</li> </ol>	
Conduct Environmental Studies and Agency Coordination	<ol style="list-style-type: none"> <li>1. Identify historic-age resources and evaluate National Register eligibility.</li> <li>2. If no historic-age resources present or no historic-age resources are National Register eligible, make finding of no historic properties affected.</li> <li>3. Consult on measures to resolve adverse effects on historic properties with consulting parties and the public.</li> </ol>	<ol style="list-style-type: none"> <li>1. Identify historic sites.</li> <li>2. Determine if there is a use, and if there is a use, determine if any of the exceptions apply (23 CFR 774.13). If cannot apply exceptions, determine appropriate approval option: de minimis, programmatic evaluation, or individual evaluation.</li> </ol>
Prepare NEPA Documentation	Execute agreement document codifying measures to resolve adverse effects prior to approval of CE.	Document Section 4(f) approval option.
Obtain NEPA Approval		Obtain approval of Section 4(f) documentation.
NEPA Participants:  District Environmental Staff  Environmental Affairs Division: Project Delivery  Public Involvement Section in the Transportation Planning and Programming Division	106 Participants:  Environmental Affairs Division: Cultural Resource Management Section  District Environmental Staff	Section 4(f) Participants:  Environmental Affairs Division: Environmental Staff; Cultural Resource Management Section  Environmental Affairs Division: Project Delivery  District Environmental Staff

NEPA and Section 4(f) are related as well. The purpose and need statements and the description of the selected alternative in the NEPA document and the Programmatic Section 4(f) Evaluation must match. Additionally, Section 4(f) is one of the many laws that falls under the NEPA umbrella, and the results of the Programmatic Section 4(f) Evaluation are reported in the proposed project's NEPA document. The results may be reported in the NEPA document through reference or by including the Programmatic Section 4(f) Evaluation as an appendix to the NEPA document. This decision is made on a project-by-project basis.

For more information regarding regulations, policies, or guidance regarding Section 4(f) or other laws that coincide with Section 4(f), see the sources listed in **Appendix F**.

Appendix B contains a timeline of the Programmatic Section 4(f) Evaluation process. This timeline can also be found in the Historic Bridge Manual.

## Process of Preparing a Programmatic Section 4(f) Evaluation

A Programmatic Section 4(f) Evaluation is a complex, technical document that draws upon data and input from various sources. Identifying the potential need for a Programmatic Section 4(f) Evaluation as early as possible in the project development process and establishing clear and open lines of communication are keys to streamlining the process. This section provides a recommended approach to the data gathering process of writing a Programmatic Section 4(f)

Evaluation. These recommendations assume the TxDOT district environmental staff, TxDOT Environmental Affairs (ENV) Historian, or one of their consultants will be the evaluation's primary author.

The process of writing a Programmatic Section 4(f) Evaluation typically involves numerous people. Table 2 describes the likely participants and their roles.

Table 2. Participants and Roles in Programmatic Section 4(f) Evaluation Writing Process

Participant	Role
TxDOT Engineering Project Manager (District or Area Office Engineer in charge of project)	Primary liaison between author and other participants; conduit of information; general input on engineering details for alternatives analysis
Historic Bridge Programmatic Section 4(f) Evaluation Author	Determines information needs; compiles information into evaluation document
TxDOT District environmental staff	Liaison between participants and conduit of information to be used in evaluation (potential author)
TxDOT ENV Historian	Input on historical significance, character-defining features, and effects determinations; provides Section 106 coordination results (potential author)
TxDOT Bridge Division Project Management Liaison	Responsible for obtaining a copy of the bridge condition assessment and for writing the Historic Bridge Team (HBT) report.

Other participants in the process may include the TxDOT district bridge engineer, local government engineers, or local officials. The TxDOT Engineering Project Manager in charge of the project is central to the writing process as they serve as the liaison with other technical participants for the information exchange necessary to complete the Programmatic Section 4(f) Evaluation. As Table 2 shows, the Engineering Project Manager and the Programmatic Section 4(f) Evaluation author work together throughout the process, while relying on information and input from other participants.

### Coordination and Meetings

Coordination among participants should occur throughout the process of preparing the Programmatic Section 4(f) Evaluation, whether via meetings, telephone calls, or other means. ENV historians shall determine the need to prepare a Programmatic Section 4(f) Evaluation. At that time, the district staff will work with the appropriate Bridge Division Project Management staff to perform a condition assessment of the

bridge in question. Depending on the type of bridge and the workload of TxDOT staff and consultants, the preparation of a condition assessment may take at least six (6) months. This condition assessment forms the basis of a Historic Bridge Team (HBT) report.

All key players must participate in a kick-off meeting including those who will write or provide key information for the Programmatic Section 4(f) Evaluation. The following activities should occur at the kick-off meeting:

- Define each person's role in the process
- Establish the project's need and purpose (see Appendix C for sample purpose and need statements)
- Outline alternatives and what type of information may be needed to describe each alternative (see TxDOT Historic Bridge Manual and the Section 4(f) Programmatic Evaluation of Historic Bridge Projects checklist)
- Set due dates for providing needed information to appropriate person and finalization of HBT
- Determine who will author the Programmatic Section 4(f) Evaluation (if not already determined)



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- Discuss timeline for preparing Programmatic Section 4(f) Evaluation (typically 6-9 months after the completion of the condition assessment)
- Establish the protocol for communication among participants
- Establish point(s) of contact

After the kick-off meeting, the primary participants should visit the historic bridge and discuss its condition and the options available.



Visiting the historic bridge can inform alternative selection and highlight the traffic needs of the crossing.

If necessary, subsequent meetings could be scheduled to focus on the details of the alternatives analysis. These meetings should provide the information necessary to prepare the draft document.

Continual communication among the participants in the overall process is critical and information exchange should be ongoing and frequent.

### What information is used to write the Programmatic Section 4(f) Evaluation?

The Historic Bridge Team (HBT) Report provides key information for the Programmatic Section 4(f) Evaluation and

alternatives analysis. The TxDOT Bridge Division's Project Manager can provide the HBT Report if it is not provided at the beginning of the Programmatic Section 4(f) Evaluation process.

Other sources of information that might be used to complete the Programmatic Section 4(f) Evaluation Checklist include:

- Bridge condition assessment report
- Bridge inspection reports
- Bridge Inspection Database data (also known as AssetWise)
- Traffic studies
- Accident statistics
- Federal Emergency Management Agency (FEMA) rating maps
- Right-of-way information
- TxDOT Design Standards and Guidelines
- Bridge Design Manual
- Bridge Project Development Manual
- Historic Bridge Manual
- Roadway Design Manual
- American Association of State Highway and Transportation Officials (AASHTO) Standards and Guidelines
- A Policy on Geometric Design of Highways and Streets (Green Book)
- Bridge Design Specifications
- Guidelines for Historic Bridge Rehabilitation and Replacement
- FHWA Standards and Guidelines
- Programmatic Section 4(f) Evaluation and Approval for FHWA Projects that Necessitate the Use of Historic Bridges
- Technical Advisory: Guidance for Preparing and Processing Environmental and Section 4(f) Documents, Part IX (T 6640.8A)
- NHPA Section 106 consultation outcomes
- Project's NEPA document (if available)
- Other project-related data or data from project-specific studies required as project warrants



## Elements of Programmatic Section 4(f) Evaluation

### What needs to be included in a Historic Bridge Programmatic Section 4(f) Evaluation?

The Historic Bridge Programmatic Section 4(f) Evaluation must include thorough explanations and detailed justifications for the engineering decisions that are made throughout the project planning process. TxDOT created a Section 4(f) Programmatic Evaluation of Historic Bridge Projects checklist to streamline the process, document that all alternatives were fully evaluated, and ensure the project conforms to regulatory completeness as set forth by regulations prescribed by Section 4(f) of the U.S. DOT Act. This checklist is organized under the following headings:

- I. Description of Section 4(f) Property, Project Scope, and Need and Purpose Statement
- II. Determination of Applicability
- III. Identify additional Section 4(f) properties in the project area
- IV. Alternatives Considered/Findings
- V. Measures to Minimize Harm
- VI. Mitigation Commitment
- VII. Summary and Approval

*The next section outlines the information that should be included in the Programmatic Section 4(f) checklist, what types of questions should be addressed, where to find the information to answer the questions, and what illustrations should accompany the information presented in the text.*



Lone Wolf Bridge, Tom Green County

## I. Description of Section 4(f) Property, Scope, and Purpose and Need

### What is required in the Description of the Section 4(f) Property section?

The description of the Section 4(f) property includes detailed information regarding the bridge, its physical appearance, and its historical significance. The description of the Section 4(f) property should include the following information:

1. Brief physical description of the historic bridge
2. Historical significance of the structure
3. Bridge's character-defining features

Photographs of the bridge's superstructure, substructure, deck, and character-defining features should be included as an attachment to supplement the description of the historic bridge.

### What is needed for the physical description of the bridge and where is the information?

The physical description of the bridge should be brief. A detailed narrative of the bridge's superstructure, substructure, approaches, and load capacity should be included in the HBT report, which will be an attachment to the checklist.

### How is the historical significance documented?

The historical significance of the bridge documents why the bridge is eligible for or listed in the NRHP, includes a statement of significance for the historic bridge, and describes the bridge's character-defining features. ENV Historical Studies staff provides the information that informs this section of the document. This section includes the following information:

- NRHP criteria and level of significance under which the bridge is eligible for or listed in the NRHP
  - A historic bridge is eligible or listed under Criterion A (Events), Criterion B (People), Criterion C (Design/Construction), and/or Criterion D (Information Potential), and
  - A historic bridge is eligible or listed at the local, state, or national level of significance.<sup>2</sup>

- Example text: The CR 515 bridge at Clear Creek is eligible for the NRHP under Criterion C, Engineering, at the local level of significance.
- Other designations, such as State Antiquities Landmarks (SAL) or local landmarks, if applicable.
- Significance statement that outlines why the bridge is listed in or eligible for the NRHP
- List of character-defining features of the bridge.

### What are character-defining features and how are they documented?

The bridge's character-defining features are the elements of the bridge that significantly contribute to its physical character and make it eligible for the NRHP. For example, the character-defining features of an NRHP-eligible Warren pony truss are its polygonal top chord, riveted connections, and external sway braces.



Craft Road at Choctaw Creek Bridge, Paris District

Without these character-defining features the bridge would not be listed, or eligible for listing, in the NRHP for its engineering merit. ENV Historical Studies staff is the best source for this information. To best document the character-defining features of a bridge, include photographs of these features in an exhibit of the Programmatic Section 4(f) Evaluation.

<sup>2</sup> As noted on page 3, a Programmatic Section 4(f) Evaluation cannot be completed for a bridge that is eligible for or listed in the NRHP under any criterion at the national level/is a National Historic Landmark (NHL).

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### What information is included in the Scope?

The scope should include specific information regarding the project location and setting. It is important to describe the properties and landscape surrounding the project. The scope

should also note the presence of other Section 4(f) properties located in the project area that may affect the alternatives.

Table 3 below provides a list of the information that is recommended for inclusion in the project location and setting description, and where such information can be found.

Table 3. Project Location and Settling Information

Location and Setting Information	Source
<b>Bridge-specific information</b>	
Road name or highway number	Bridge Inventory Database (BID)
Feature bridge crosses	BID
Location of subject bridge: <ul style="list-style-type: none"> <li>Distance to nearby major highways</li> <li>Distance to nearby cities (rural bridges only)</li> </ul>	Aerial, topographic, or highway maps
<b>Roadway-specific information</b>	
Location of roadway in relations to other roads	Aerial, topographic, or highway maps
Length of roadway, if applicable (likely rural roads only)	Aerial, topographic, or highway maps
Orientation of roadway, such as north/south or east/west	Aerial, topographic, or highway maps
Function classification of roadway	BID, bridge inspection reports
Roadway surface	Photographs, site visit
Roadway width	BID
Average Daily Traffic (ADT)	BID
Year ADT count completed	BID
Projected ADT	NEPA document, HBT report
Projected year for ADT	NEPA document, HBT report
<b>Bridge's setting</b>	
General setting, for example: <ul style="list-style-type: none"> <li>Suburban</li> <li>Urban</li> <li>Rural</li> </ul>	Photographs, site visit, recent aerial photographs
Surrounding property types, for example: <ul style="list-style-type: none"> <li>Agricultural</li> <li>Residential</li> <li>Commercial</li> <li>Industrial</li> <li>Recreational</li> </ul>	Photographs, site visit, recent aerial photographs
Section 4(f) Properties, for example: <ul style="list-style-type: none"> <li>Parks</li> <li>Wildlife Refuges</li> <li>Recreation Areas</li> <li>Other historic sites</li> </ul>	NEPA document, TxDOT environmental staff, site visit, maps
Land use, for example: <ul style="list-style-type: none"> <li>Farms (specify type if possible)</li> <li>Ranches</li> <li>Natural gas or oil fields</li> <li>Railroad</li> </ul>	Photographs, site visit, recent aerial photographs
<b>Location and setting information</b>	



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Location and Setting Information	Source
Features and obstacles surrounding bridge, for example: <ul style="list-style-type: none"><li>• Canyons</li><li>• Cliffs</li><li>• Ravines</li><li>• Railroad lines</li><li>• Railroad bridges</li><li>• Dams</li></ul>	Photographs, site visit, recent aerial photographs

What graphics should be included to supplement the Scope?

The scope must include road and aerial maps that show the project location and any additional Section 4(f) properties. The Programmatic Section 4(f) Evaluation should also include photographs of the project area, including those that show the bridge approaches, views looking upstream and downstream of the bridge, and land use surrounding the bridge. Label the photographs to describe subject of image, including the location in relation to the historic bridge.



A railroad bridge downstream of the historic bridge limits alternative options for bypassing the historic bridge with a new one.



The approach road has a blind curve leading on to a narrow historic bridge, which causes safety issues for approaching traffic.



A barn and agricultural field are adjacent to a historic bridge. The presence of this property could indicate the type of traffic needed to access the bridge (oversized tractors or trailers) and can also indicate the need to review the NRHP eligibility of adjacent properties to identify other potential Section 4(f) resources.



This historic bridge is within a residential neighborhood.

### What is the Purpose and Need Statement?

The purpose and need statement justifies why a proposed project is necessary. It establishes the objective of the project and guides the development of project alternatives. Furthermore, the purpose and need statement must parallel the purpose and need statement in the NEPA document (if one is necessary), which will require coordination.

The need is the most important part of the purpose and need statement because it outlines the problem that exists and provides the justification for the expenditure of public funds to correct the problem. Conversely, the purpose defines the project objective and focuses on the desired outcome. For this reason, this statement is sometimes informally referred to as the need and purpose statement since the need for the project should be established first and the purpose is determined second. See Appendix C for more information on writing a good purpose and need statement.

### Is a low sufficiency rating of a bridge the only thing that needs to be referenced in the purpose and need statement?

Sufficiency ratings of bridges are not adequate to illustrate the purpose and need for a project. While factors regarding the bridge's physical condition and geometry inform sufficiency ratings, these ratings are only a tool indicating that a bridge is eligible for federal funding for rehabilitation (bridges with a score less than 75) or replacement of the structure (bridges with a score less than 50). The sufficiency rating does not provide sufficient detail regarding the problems that prompted the need for the proposed action.

### How is the need for the project demonstrated?

The purpose and need section should focus on demonstrating why the project must be completed and outline each problem that the proposed action will address in detail. Most importantly, this section should be overt and easy to understand for the lay reader. A successful purpose and need statement does not simply state the needs of the project, it justifies the need with supporting evidence. In essence, this portion of the Programmatic Section 4(f) Evaluation convinces the reader that the proposed action is defensible and warranted. The types of needs often associated with bridge replacement projects fall into three main groups: structural deficiencies, functional inadequacies, and geometric deficiencies. A sample list of typical problems and needs associated with these three groups as related to historic bridges are illustrated in Appendix C.

The purpose and need section should describe and group the existing conditions and problems of the subject bridge under the headings Structural Deficiencies, Functional Inadequacies, and Geometric Deficiencies. Only discuss and include information regarding the needs identified by project engineers for the specific project. For example, if a bridge only has structural deficiencies and functional inadequacies, do not include a discussion of geometric deficiencies in the Purpose and Need Statement.

### How do I gather the information to describe the need for the project?

To adequately explain the need for the project, the author must describe the problems with the current bridge and/or roadway thoroughly and in detail. Appendix C includes the types of questions that the author should answer when describing the needs of a proposed action and the sources that can be reviewed or consulted to answer the questions.

### What type of illustrations should be included to demonstrate the project?

The author should demonstrate the need for the project with photographs, maps, and typical sections if possible. Photographs and maps not only supplement the justification and need for the project, they also provide the lay reader a visual understanding of the problems at hand. Illustrations and photographs should be included in attachments at the end of the checklist document.



## II. Determination of Applicability

The purpose of this section is to determine whether the Section 4(f) Programmatic Evaluation of Historic Bridge Projects checklist can be used for this project. In order to determine if a Programmatic Section 4(f) Evaluation is applicable for this project, the project must fulfill all of the following statements:

- The project requires the use of a bridge defined as historic per Section 106 regulations (listed in or eligible to be listed in the National Register of Historic Places)
- The historic bridge is not a designated National Historic Landmark (NHL).
- The project results in a Section 4(f) use of a historic bridge, AND
- Additional impacts to protected Section 4(f) properties are limited to *de minimis* or exception categories as specified in the Scope.



Colorado River Bridge, Bastrop County



### III. Identify additional Section 4(f) properties in the project area

This section of the checklist must note the presence of other Section 4(f) properties, including parks, wildlife refuges, recreation areas, or other historic sites, located in the project area (including exception, *de minimis*, or other programmatic

4(f) properties). Knowledge of other Section 4(f) properties in the project area is imperative when reviewing the avoidance alternatives.



U.S. Highway 81, Bell County

## IV. Alternatives Considered/Findings

### What is the purpose of the Alternatives Analysis section?

The intent of the Section 4(f) statute is to avoid the use of historic sites, including historic bridges, as part of a proposed action unless there is no feasible and prudent alternative to that use. Therefore, the alternatives analysis evaluates each alternative to determine if there is a feasible and prudent alternative that avoids the use of a historic bridge. If TxDOT identifies a feasible and prudent alternative that avoids the use of a historic bridge, TxDOT must choose that alternative (see page 19 for a list of avoidance alternatives that must be considered). If TxDOT determines there is no feasible and prudent avoidance alternative, then TxDOT may choose an alternative that uses the historic bridge, while posing the least harm to the historic bridge.

The alternatives analysis must prove why each alternative is or is not feasible and prudent and should include the justification for proceeding with the selected alternative. As in the purpose and need section, the alternatives analysis must document all aspects of engineering assessments and decisions. This section must also be described as simply as possible for the lay reader to understand.

### What are avoidance alternatives?

Avoidance alternatives are those alternatives that do NOT cause a Section 4(f) use to the bridge. See page 6 for more information about what constitutes a “use” of a historic bridge.

### What are use alternatives?

Use alternatives are those that cause a Section 4(f) use to the historic bridge. See page 6 for more information about what constitutes a “use” of a historic bridge.

### What is a feasible and prudent avoidance alternative?

Federal regulations define a feasible and prudent avoidance alternative “as one that avoids using a Section 4(f) property and does not cause other severe problems of a magnitude that substantially outweighs the importance of protecting the Section 4(f) property” (23 CFR 774.17).

Applying the criteria for a feasible and prudent avoidance alternative is critical to the Historic Bridge Programmatic Section 4(f) Evaluation. This mandates that the alternatives analysis process is fully documented with supporting evidence. A comparison of current conditions to expected conditions under each avoidance alternative should be used when applying the feasible and prudent criteria. Furthermore, quantifying information included in the alternatives analysis will support the comparison. For example, providing the costs associated with alternatives will help inform a direct comparison of alternatives. TxDOT makes the ultimate decision on whether or not an avoidance alternative is feasible and prudent based on the measurable evidence used to justify and support the alternatives analysis.

### What is the criterion for a feasible avoidance alternative?

A feasible alternative is one that is possible to design and build using sound engineering judgment.

### How is an avoidance alternative determined to be prudent or not?

The Section 4(f) regulations state an alternative is NOT prudent if:

1. It does not meet the project’s purpose and need;
2. It results in unacceptable safety or operational problems;
3. After reasonable mitigation it still causes:
  - a. Severe social, economic, or environmental impacts;
  - b. Severe disruption to established communities;
  - c. Severe disproportionate impacts to minority or low-income populations; or
  - d. Severe impacts to environmental resources protected under other federal statutes, such as archeological sites, wetlands, or endangered species
4. It results in additional construction, maintenance, or operational costs of an extraordinary magnitude;
5. It causes other unique problems or unusual factors; OR
6. There is an accumulation of circumstances that collectively, rather than individually, have adverse impacts that present unique problems or reach extraordinary magnitudes.

## PART 1: HISTORIC BRIDGE PROGRAMMATIC SECTION 4(F) GUIDELINES

Although not an inclusive list of examples, the FHWA's Programmatic Section 4(f) Evaluation and Approval for FHWA Projects that Necessitate the Use of Historic Bridges provides a number of circumstances where an avoidance alternative would not be prudent, including the following:

- Current structure is built at the only feasible and prudent site, and building a new structure would pose extraordinary bridge and approach engineering and construction difficulty
- Extensive severing of productive farmlands
- Displacement of a significant number of families or businesses
- Serious disruption of established travel patterns
- Access and damage to wetlands
- Significantly increased roadway and structure costs
- Serious foundation problems
- Extreme difficulty in reaching the new site with construction equipment
- Lack of ability to achieve minimum design standards or meet requirements of various permitting agencies

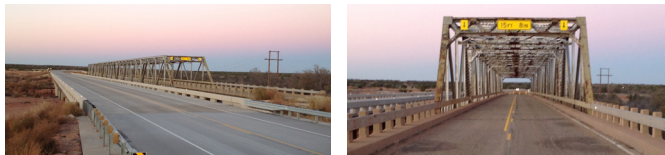
Additionally, American Association of State Highway and Transportation Officials' Guidelines for Historic Bridge Rehabilitation and Replacement provide instruction and examples for determining whether the avoidance alternative results in additional construction, maintenance, or operation costs of an extraordinary magnitude. This document also provides guidance to determine if a bridge is so structurally or geometrically deficient that it cannot be rehabilitated to meet acceptable load requirements without affecting the bridge's historic integrity.

### What alternatives must be considered?

In accordance with FHWA guidance, Historic Bridge Programmatic Section 4(f) Evaluations must consider and fully discuss three avoidance alternatives: no build, bypass, and rehabilitation that does not affect the bridge's historic integrity. TxDOT explores variations within these alternatives to show that they have been fully considered. If none of these avoidance alternatives are feasible and prudent, then TxDOT will consider an alternative that uses the bridge. Therefore, the alternatives that must be considered are:

1. No Build Alternative – do nothing, which involves no expenditure of federal funding and no project at the site.
2. Build on a New Location (Conversion to One-way Pair/ Parallel Construction with Monument) Avoidance Alternative – new construction of a bridge on parallel alignment while leaving the historic bridge in place, whether for one-way

vehicular use or as a “monument,” i.e., no access at all to the historic bridge. This alternative means TxDOT will build a new structure at a different location without affecting the character-defining features and historic integrity of the existing historic bridge, as determined by NHPA Section 106 procedures. This alternative may require that the historic bridge be rehabilitated for use by one-way traffic or left in place as a monument.



Sometimes, historic bridges can be bypassed and used for non-vehicular traffic. TxDOT must find a responsible owner willing to continue to maintain the bridge if choosing this alternative.

3. Rehabilitation of Historic Bridge (Two-way vehicular/ pedestrian Rehab or Relocated for Pedestrian Use)  
Avoidance Alternative – two-way vehicular/pedestrian on current alignment or relocated for pedestrian use. This alternative means TxDOT will rehabilitate the historic bridge without affecting the character-defining features and historic integrity of the structure, as determined by NHPA Section 106 procedures. The following rehabilitation alternatives are considered:
  - a. Continued vehicular use carrying two-way traffic
  - b. Pedestrian use in a new location



This bridge came from a more rural area to downtown Saledo.

TxDOT puts particular emphasis on the rehabilitation avoidance alternative since it considers long-term preservation of the historic bridge. Discussions regarding the feasibility and prudence of this alternative should be thoroughly described and detailed. If information regarding rehabilitation alternative is not fully explored and discussed in the HBT, the alternatives analysis section may need to include a re-examination of this alternative.



## PART 1: HISTORIC BRIDGE PROGRAMMATIC SECTION 4(F) GUIDELINES

If TxDOT determines that no avoidance alternative is feasible and prudent, TxDOT's alternatives analysis may include feasible and prudent alternatives that call for a use of the bridge. Listed in the checklist as the "Replacement on Current Alignment Alternative," this alternative is NOT an avoidance alternative and would be considered a use of the historic bridge. While not required by the FHWA, Historic Bridge Programmatic Section 4(f) Evaluations can include the discussion of more than one use alternative. The most common use alternatives are as follows:

4. Replacement on Current Alignment Alternative
  - a. Rehabilitation (use) alternative – rehabilitate the historic bridge while adversely affecting the historic integrity of the historic bridge, as determined by NHPA Section 106 procedures. For example, some rehabilitation (use) alternatives are widening the bridge, installing/replacing new crash-tested railing, or strengthening the bridge so it no longer functions as historically designed.
  - a. Replacement – replace existing bridge with a new bridge at the same or nearby location.

### Do the types of alternatives considered during the Section 4(f) evaluation vary depending on the type of historic bridge?

TxDOT plans the treatment of historic bridges within its current Section 106 Programmatic Agreement. This document includes management plans for specific bridge types. The management plans lay out and limit the number of alternatives that must be considered during the Section 4(f) evaluation process. These include plans for on-system metal truss bridges, and bridges built between 1945 and 1965 that are considered exceptionally significant, significant when considered together as a group, and significant primarily for their technological innovations.

#### ON-SYSTEM METAL TRUSS BRIDGES

On-system metal truss bridges are those owned, maintained, and inspected by TxDOT as part of the TxDOT state system. Less than 40 of these bridges remain in vehicular use. These bridges are divided into two groups (A and B). See the Section 106 Programmatic Agreement for the list of Group A and B bridges. Those bridges in Group A are prioritized for continued preservation.



On-system truss bridges used to be found all over Texas. Only a few remain today, and TxDOT is committed to preserving as many as possible.

If a historic bridge in Group A suffers a catastrophic failure, TxDOT will assess the following avoidance and use alternatives:

1. No build—leave the historic bridge in place without rehabilitation or further work.
2. Bypassing the historic bridge using an alternative alignment—assess converting the historic bridge to pedestrian use.
3. Rehabilitation:
  - For continued two-way traffic—Rehabilitation of the historic bridge should meet the Secretary of the Interior's Standards for Rehabilitation (36 CFR 67).
  - For use as part of a one-way pair—rehabilitation of the historic bridge should meet the Secretary of the Interior's Standards for Rehabilitation (36 CFR 67).
4. Replacement of the existing bridge on the existing alignment—assess demolition of the historic bridge.

TxDOT will not assess an alternative that allows leaving the historic bridge in place as a monument as the alternative is not prudent or feasible.

When it is time to replace a historic bridge in Group B, TxDOT will assess the following avoidance and use alternatives:

1. No build—leave the historic bridge in place without rehabilitation or further work.
2. Bypassing the historic bridge using an alternative alignment—assess converting the historic bridge to pedestrian use.
3. Rehabilitation:
  - For continued two-way traffic—Rehabilitation of the historic bridge should meet the Secretary of the Interior's Standards for Rehabilitation (36 CFR 67).
4. Replacement of the existing bridge on the existing alignment—assess demolition of the historic bridge.

TxDOT will not assess an alternative that allows leaving the bridge in place as a monument or moving the historic bridge, as neither alternative is prudent or feasible.

## PART 1: HISTORIC BRIDGE PROGRAMMATIC SECTION 4(F) GUIDELINES

### BRIDGES BUILT BETWEEN 1945 AND 1965

TxDOT completed an inventory of all bridges built between 1945 and 1965 in the state. This inventory included all bridges inspected by TxDOT and divides them into three groups. See the Section 106 Programmatic Agreement for a list of bridges in Groups I, II, and III.



Bridges built after 1945 are often significant for engineering achievements and pioneering materials to make longer and taller bridges.

Group I bridges are those determined as Exceptionally Significant. If a historic bridge in Group I needs rehabilitation or replacement, TxDOT will assess the following avoidance and use alternatives:

1. No build—leave the historic bridge in place without rehabilitation or further work.
2. Bypassing the historic bridge using an alternative alignment—assess leaving the historic bridge in place as a “monument” or converting the historic bridge to pedestrian use.
3. Rehabilitation:
  - For continued two-way traffic—Rehabilitation of the historic bridge should meet the Secretary of the Interior’s Standards for Rehabilitation (36 CFR 67).
  - For use as part of a one-way pair—rehabilitation of the historic bridge should meet the Secretary of the Interior’s Standards for Rehabilitation (36 CFR 67).
4. Replacement of the existing bridge on the existing alignment— assess moving the historic bridge prior to replacement and demolition of the historic bridge.

As part of the alternatives analysis, TxDOT will also discuss the feasibility of finding a new owner for the historic bridge and moving the historic bridge to a new location, although this is unlikely due to the size and type of these bridges.

Group II bridges are those that are significant when considered together as a group. The significance of the Group II bridges lies in their history, rather than their potential for preservation in place. When it is time to replace the historic

bridge TxDOT will assess the following avoidance and use alternatives:

1. No build—leave the historic bridge in place without rehabilitation or further work.
2. Bypassing the historic bridge using an alternative alignment—assess converting the historic bridge to pedestrian use.
3. Rehabilitation:
  - For continued two-way traffic—Rehabilitation of the historic bridge should meet the Secretary of the Interior’s Standards for Rehabilitation (36 CFR 67).
4. Replacement of the existing bridge on the existing alignment— assess moving the historic bridge prior to replacement and demolition of the historic bridge.

TxDOT will not assess an alternative that allows leaving the historic bridge in place as a monument as the alternative is not prudent or feasible.

Group III Bridges are those bridges that are significant primarily for their technological innovations. The significance of these bridges lies in their physical representation of these innovations, rather than their potential for preservation in place. When it is time to replace the historic bridge TxDOT will assess the following avoidance and use alternatives:

1. No build—leave the historic bridge in place without rehabilitation or further work.
2. Bypassing the historic bridge using an alternative alignment—assess converting the historic bridge to pedestrian use.
3. Rehabilitation:
  - For continued two-way traffic—Rehabilitation of the historic bridge should meet the Secretary of the Interior’s Standards for Rehabilitation (36 CFR 67).
4. Replacement of the existing bridge on the existing alignment— assess moving the historic bridge prior to replacement and demolition of the historic bridge.

TxDOT will not assess an alternative that allows leaving the historic bridge in place as a monument as the alternative is not prudent or feasible.

### What if there is no feasible and prudent avoidance alternative?

If the Programmatic Section 4(f) Evaluation concludes there is no feasible and prudent avoidance alternative, then TxDOT must select the feasible and prudent use alternative that causes the least overall harm to the historic bridge.

## PART 1: HISTORIC BRIDGE PROGRAMMATIC SECTION 4(F) GUIDELINES

### How is “least overall harm” determined?

According to 23 CFR 774.3, least overall harm is determined by balancing the following factors:

1. The relative significance of each Section 4(f) property
2. The ability to mitigate adverse impacts to each Section 4(f) property (including any measures that result in benefits to the property)
3. The relative severity of the remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each Section 4(f) property for protection
4. The views of the official(s) with jurisdiction over each Section 4(f) property (Texas SHPO is the official with jurisdiction for historic bridges)
5. The degree to which each alternative meets the purpose and need for the project
6. After reasonable mitigation, the magnitude of any adverse impacts to resources not protected by Section 4(f)
7. Substantial differences in costs among the alternatives

### How is the Alternatives Considered/Findings section laid out?

This section of the checklist includes all of the alternatives considered during the Programmatic Section 4(f) evaluation – No Build; Alternative: Build on a New Location; Alternative: Rehabilitation of Historic Bridge; and if necessary, Alternative: Replacement on Current Alignment. Each alternative features a series of statements organized under the headings “Structural Deficiencies”, “Functional/Geometric Deficiencies”, “Justification”, and Recommendation.

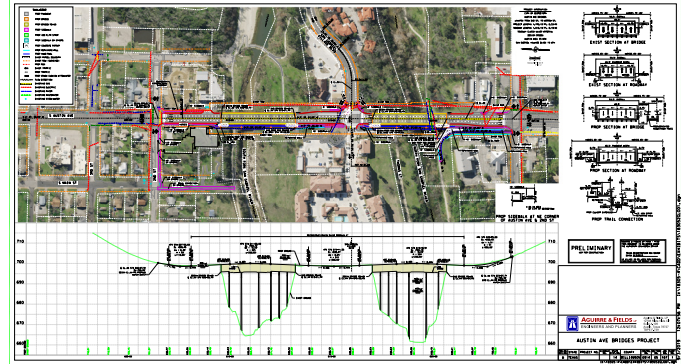
The “Structural Deficiencies”, “Functional/Geometric Deficiencies” require the author to check which statements apply. The “Justification” requires the author to include a summary describing the constraints posed by terrain; adverse social, economic, or environmental effects, engineering and economic considerations, and preservation standards. The “Recommendation” is mandatory and requires TxDOT to indicate whether the alternative is prudent and feasible and if it is recommended.

The checklist should also include an alternatives analysis chart as an attachment. This chart includes a summary of each alternative, which outlines the itemized costs of the alternative and describes why the alternative is recommended or is not recommended as feasible and prudent. See **Appendix D** for a sample chart.

Please see **Appendix D** for detailed descriptions of the alternatives and questions that the Programmatic Section 4(f) evaluation should investigate during the alternatives analysis.

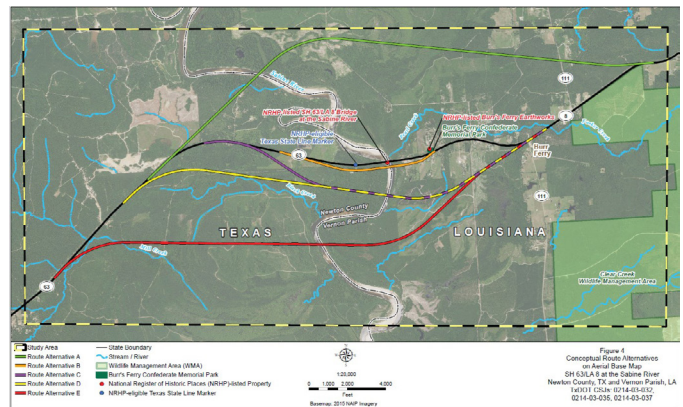
### Typical sections

Typical sections should be included to illustrate the width of the existing and proposed bridge, and right of way.



### Schematics or line drawings

While not required, schematics or line drawings can be extremely helpful when illustrating the alternatives considered for the proposed project. They do not need to be elaborate; however, they should show each alternative in relation to the historic bridge.



Multiple alternatives can be analyzed for historic bridge projects.



## V. Measures to Minimize Harm – Planning Efforts

### What are Measures to Minimize Harm?

In addition to evaluating if there is a feasible and prudent avoidance alternative, the law requires the consideration of all possible planning to minimize harm to the historic bridge. Determined on a project-by-project basis, measures to minimize harm to historic bridges are generally grouped into two categories: planning efforts and mitigation. Planning efforts occur during the project development phases, prior to the completion of the Section 4(f) process. On the other hand, mitigation includes actions that will be taken following the completion of the Section 4(f) process that compensate for residual impacts to the historic bridge. It is important to consider and incorporate both types of measures into projects.

The project team can include many types of planning efforts that attempt to lessen the impacts to the historic bridge. Three common types of planning efforts—design modifications, consideration of public input, and bridge marketing—are outlined below; however, circumstances may warrant additional planning efforts.

#### DESIGN MODIFICATIONS

Modifications to the design that lessen the harm to the historic bridge should be noted as measures to minimize harm in the Programmatic Section 4(f) Evaluation. The following are examples of design modifications that would lessen the impacts to the historic bridge:

- Hiding strengthening members on a rehabilitated bridge
- Replacing rivets with dome-head bolts
- Replacing rivets in-kind
- Use of non-standard or aesthetic railing for rehabilitated bridge



TxDOT added in a crash-tested rail on the interior of this historic bridge to allow for the rehabilitation and continued use of the bridge.

#### CONSIDERATION OF PUBLIC INPUT

The historic bridges that are the subjects of the Programmatic Section 4(f) Evaluations are public property. It is important to incorporate input from the public, advocacy groups, and preservation officials into the project's planning process. Input gathered during public meetings or hearings held in compliance with Section 106 of the NHPA and/or NEPA should be considered by project planners and included in the measures to minimize harm section of the Programmatic Section 4(f) Evaluation.



Additionally, consultation with the Historic Bridge Foundation, the County Historical Commission, and the SHPO that may occur as part of the Section 106 process should also be incorporated into the evaluation as a measure to minimize harm.

## PART 1: HISTORIC BRIDGE PROGRAMMATIC SECTION 4(F) GUIDELINES

For example, the consulting parties or the public may want to keep a historic bridge functioning in place even if the rehabilitation work does not meet the Secretary of the Interior's Standards for Rehabilitation. For controversial projects, project engineers may consider having a design charrette and inviting the public to provide their input into any new design.

### TXDOT'S HISTORIC BRIDGE LEGACY PROGRAM

FHWA requires that if any historic bridge (regardless of type) is to be replaced, TxDOT must make it available to a responsible state, local, or private entity for a different use. Proactively finding a new location for the historic bridge in the same county or region is recommended because keeping the bridge within the same general area is preferred. Approaching local officials and park commissioners should be considered before other potential recipients or marketing the bridge to the public.



TxDOT relocated this bridge to cross a small stream at a park.

TxDOT's Area Office engineers may provide suggestions of local entities that may be potential recipients of the bridge. TxDOT and the Texas SHPO recommend that if a bridge spanned water in its historic location, it should span a waterway in its new location. If a recipient cannot be found through proactive measures, TxDOT must conduct a more public search.

TxDOT has a bridge marketing program called the Historic Bridge Legacy Program. TxDOT maintains a website for prospective owners of historic bridges that contains a list of all bridges available for new ownership, sample costs, sample agreement documents, and success stories. Any copies of outreach conducted to find responsible new owners of a historic bridge, such as website postings, press releases, emails, and mailing lists, must be maintained and provided as part of the Section 4(f) checklist. For information regarding the relocation of historic bridges, please see the section on mitigation below.

If TxDOT is unable to locate a suitable recipient for a historic bridge, then TxDOT shall mitigate the loss of the historic bridge.

For step-by-step instructions about the bridge marketing program, see TxDOT Bridge Division's Historic Bridge Manual and TxDOT's Historical Studies toolkit

### What is included in the Measures to Minimize Harm section of the checklist?

This section of the Programmatic Section 4(f) Evaluation includes four statements about measures to minimize harm. The author should indicate all statements that apply, but a minimum of one must be selected. The author should also verify that the project includes all possible planning to minimize harm.

## VI. Measures to Minimize Harm – Mitigation

In consultation with the SHPO and other consulting parties, TxDOT identifies appropriate mitigation measures for any adverse effects to a historic bridge. It is important to remember that SHPO and consulting party concurrence, as well as notification to the Advisory Council on Historic Preservation (ACHP) is required prior to implementing a mitigation plan. Consultation provides an additional opportunity to “think outside the box” and identify possible mitigation options. The cost of mitigation should be a reasonable public expenditure in relation to the severity of impacts to the 4(f) resource. Although each situation will be unique and it is not possible to anticipate all possibilities, the following are a few examples that may help generate discussion about other options:

### RELOCATION

Relocation is a mitigation option common for smaller truss bridges as they are often designed to be moved. TxDOT has successfully relocated about half of its historic truss bridges that have been removed from vehicular service.

Once a responsible recipient of the historic bridge is found, TxDOT enters into an agreement describing TxDOT’s and the recipient’s responsibilities toward the bridge as a result of the relocation. A relocation plan, developed and used in the NHPA Section 106 effects determination, is included in the Programmatic Section 4(f) Evaluation as an exhibit.



A large crane removes a historic bridge and places it on a truck for relocation.

### DOCUMENTATION

For bridges that are to be rehabilitated to the point that the historic integrity is adversely affected, or that are to be moved or demolished, a detailed history of the bridge, high-quality photographs, or other suitable means of documentation may be appropriate. The bridge history and photographs can be used for online StoryMaps, in exhibits, or in videos about bridge history in Texas.

### NEW BRIDGE AESTHETICS/DESIGN

If a new vehicular bridge is to be built, engineers can make the new bridge aesthetically pleasing or evocative of the historic bridge. For example, a variable depth concrete slab bridge can be replaced with a variable depth box girder bridge. Another example is using a crash-tested railing that is reminiscent of the historic bridge’s railing.



This drawing shows a different crash-tested rail on a historic concrete bridge.

Remember that coordination with the SHPO and all consulting parties should be conducted prior to proceeding with this type of mitigation effort.



## PART 1: HISTORIC BRIDGE PROGRAMMATIC SECTION 4(F) GUIDELINES

### INTERPRETATION

Interpretive displays can be placed in areas such as museums, parks, walking trails, rest areas, and pull outs.



After replacing the US 77 Viaduct in Waxahachie, TxDOT developed interpretation about the history of the bridge and transportation in the city.

### EDUCATIONAL MATERIALS

Educational materials can be targeted toward the general public, such as informational brochures, videos, and driving tour pamphlets. Other materials can be developed in conjunction with state educational standards and targeted toward children. This is an opportunity for creativity in developing the mitigation plan.

**UN Puente DEL TAMAÑO DE TEXAS**

A medida que el comercio portuario aumentaba, se notaba que Corpus Christi necesitaba un nuevo puente. ¡Tienen un lugar reconocido!

**OBSTRUCCIÓN EN EL PUENTE**

Luego de la Segunda Guerra Mundial, las industrias de petróleo y gas crecieron rápidamente. Más embarcaciones de tanques necesitaban acceso al puerto y estos barcos eran más grandes que antes. Para la década de los 1950, Corpus Christi era hogar del noveno puerto más ocupado de la nación. Pero el Harbor Bridge de 1926 era un punto de congestión para carros y tráfico de barcos y a la misma vez un obstáculo al crecimiento económico. Muchas veces al día, motoristas tenían que esperar hasta que el puente anticuado abriera para permitir el paso a los barcos, los cuales navegaban lentamente a través del camino. Si el Puerto de Corpus Christi iba a continuar creciendo, este necesitaba un camino más espacioso para los barcos.

**UN RETO PARA LA INGENIERÍA**

En la década de 1950, el Cuerpo de Ingenieros del Ejército elaboró planes para crear un canal de navegación de 400 pies mucho más amplio. El Departamento de Carreteras de Texas (hoy conocido como TxDOT) asumió el desafío de diseñar y construir un nuevo Harbor Bridge que pudiera abarcar la distancia. Los ingenieros del Departamento entendieron que el puente tendría que ser lo más alto posible para permitir que los barcos pasaran por debajo. También tenía que ser lo suficientemente fuerte para soportar un tráfico de

BARCO ENTRANDO EL PUERTO DE CORPUS CHRISTI, 1950s. FOTOGRAFÍA ANTIGUA COLECCIÓN DE LA BIBLIOTECA DEL CONGRESO.

La apertura de 90 pies de ancho del Harbor Bridge de 1926 presentaba un reto en la navegación. Algunos capitanes de embarcaciones lo llamaban "esfregar la aguja".

EL TRAFICO ESPERANDO EN EL PUENTE LEONARDO, 1957. DOK MCGUIRE COLLECTION, CORPUS CHRISTI MUSEUM OF SCIENCE AND HISTORY.

Motoristas esperaban hasta media hora cada vez que el Harbor Bridge de 1926 abría para dejar pasar un barco al puerto. Estas frustrantes congestiones vehiculares llevaron a enojos y demandas para solucionar este problema.

VIGGO MILLER, 1950s-1960s. TEXAS DEPARTMENT OF TRANSPORTATION.

Viggo Miller, de la División de Puentes, fue uno de los principales diseñadores del Harbor Bridge de 1959. Observe la calculadora y las herramientas de diseño para dibujos en su escritorio.

TxDOT developed fully-bilingual mitigation products for the replacement of Corpus Christi's Harbor Bridge.

## PART 1: HISTORIC BRIDGE PROGRAMMATIC SECTION 4(F) GUIDELINES

### Examples of Various TxDOT Mitigation Measures for Historic Bridges

- Detailed local histories of three Warren pony truss bridges
- Historic bridge documentary report (research and in-depth history on context of historic truss bridges)
- Museum exhibits on truss and transportation history
- San Saba Historic Bridges Tour, as done through a StoryMap
- Scanning and mapping of lost truss bridges in the Brownwood and Lufkin TxDOT Districts
- History of bridges and crossings along the Red River (mitigation led by Oklahoma DOT)
- Video about moving a truss bridge in Hamilton County
- Texas Historic Bridges StoryMap
- STEM in History Museums training and educational activities

### What is included in the Mitigation Commitment section of the document?

This section of the Programmatic Section 4(f) Evaluation should fully describe the mitigation commitment. Provide information such as:

- Mitigation Type
  - Programmatic Mitigation
  - Customized Mitigation

**Programmatic Mitigation** is mitigation completed as part of a larger historic bridge mitigation effort. Because adverse effects to historic bridges are relatively common, TxDOT proactively mitigated groups of historic bridges in order to provide educational and public-facing materials. For instance, the adverse effects to certain on-system truss bridges and historic bridges built between 1945 and 1965 have already been mitigated through educational programs and trainings developed specifically around the contexts of those bridges. TxDOT is continually searching for ways to group historic bridge mitigation.

**Customized Mitigation** is mitigation completed specifically for the adverse effect to a particular bridge. This type of mitigation is often developed in consultation with consulting parties and may result in moving a bridge, developing interpretation around that specific bridge, or salvaging physical aspects of the bridge.



A small portion of the Waxahachie US 77 Viaduct railing was salvaged during the bridge's demolition.

## VII. Summary and Approval

The Summary and Approval section of the Programmatic Bridge Section 4(f) Evaluation is a general statement that summarizes what preparing this checklist means. This section states that the review, consultation, and other actions have been carried out by TxDOT according to all legal standards, the proposed project meets all applicability criteria set forth in the Programmatic Bridge Section 4(f) Evaluation, TxDOT fully evaluated all alternatives, and the project includes all possible planning to minimize harm.

This section also lists the documents that must be attached to the checklist:

1. Work Plan Development (WPD) | Screen Printout from ECOS
2. Concurrence letter with the Official with Jurisdiction
3. Proof of Historic Bridge Marketing
4. Historic Bridge Team Report
5. Detour Map
6. Photographs of the bridge detailing conditions cited in alternatives analyses
7. Comparative alternatives analysis chart



Texas 29, Williamson County



## PART 2: HISTORIC BRIDGE PROGRAMMATIC SECTION 4(F) DOCUMENTATION STANDARDS (APPENDICIES)



Texas 71 Pedernales River, Travis County

## APPENDIX A

### List of Acronyms

AASHTO – American Association of State Highway and Transportation Officials

ACHP – Advisory Council on Historic Preservation

ADT – Average Daily Traffic

BID – Bridge Inventory Database (AssetWise)

BRG – Texas Department of Transportation Bridge Division

BRG C/M – Bridge Division Construction and Maintenance Engineer

BrgE/DesE – Bridge/Design Engineer

CE – Categorical Exclusion

CFR – Code of Federal Regulations

CHC – County Historical Commission

CR – County Road

DOT – Department of Transportation

EA – Environmental Assessment

EC/ES – Environmental Coordinator/Specialist

ECOS – Environmental Compliance Oversight System

EIS – Environmental Impact Statement

ENV – Texas Department of Transportation Environmental Affairs Division

ENV HIST – Texas Department of Transportation Environmental Affairs Division Historical Studies Staff

FEMA – Federal Emergency Management Agency

FM – Farm to Market Road

FHWA – Federal Highway Administration

HBD – Historic Bridge Database

HBF – Historic Bridge Foundation

HBT – Historic Bridge Team

IH – Interstate Highway

MOA – Memorandum of Agreement

NBI – National Bridge Inventory

NEPA – National Environmental Policy Act

NHL – National Historic Landmark

NHPA – National Historic Preservation Act

NRHP – National Register of Historic Places

ODOT – Oklahoma Department of Transportation

OWJ – Official with Jurisdiction

PM – Project Manager

ROW – Right of Way

SAL – State Antiquities Landmark

SH – State Highway

SHPO – State Historic Preservation Officer (see THC)

SOI – Secretary of the Interior

STIP – Statewide Transportation Improvement Program

THC – Texas Historical Commission (see SHPO)

TxDOT – Texas Department of Transportation

## APPENDIX B

### Historic Bridge Project Development Process Overview and Timeline

The following table provides an overview of the project development process for historic bridges. The table includes the required activity, responsible party, and approximate time requirements.

Table 4. Historic Bridge Project Development Process

Process Step	Responsible Party	Action	Duration
1.	District BrgE/DesE and/ or District EC/ES  District EC/ES	<p>Confirm bridge's historic status and eligibility with ENV HIST.</p> <p>Request historic bridge condition assessment from BRG PM.</p> <p>Provide BRG PM the last two inspection reports including structural member list, channel profiles, load rating calculations, photos, and existing plans, if available.</p> <p>Relay general project goals: roadway is being realigned or local entity prefers to have bridge rehabilitated, etc.</p> <p>Develop a tentative project schedule using duration times presented in this table.</p> <p>Request statement of historic significance from ENV HIST.</p> <p>Develop draft Need and Purpose statement.</p>	15 hours over 1 month
2.	BRG PM	<p>Request Historic Bridge Condition Assessment</p> <p><u>Off-System Bridges</u></p> <p>Request a historic bridge condition assessment consultant work authorization from BRG Inspection Branch.</p> <p>NOTE: Request a condition assessment prior to executing an Advanced Funding Agreement with a local government.</p> <p><u>On-System Bridges</u></p> <p>Request a historic bridge condition assessment from BRG Construction/Maintenance Branch.</p> <p>OR: Request a historic bridge condition assessment consultant work authorization from BRG Inspection Branch.</p>	<p>4 months (+3 weeks to obtain work authorization)</p> <p>3 months</p>
3.	ENV HIST  Lead: BRG PM Assist: All participants	<p>Develop Statement of Historic Significance and provide to BRG PM and District EC/ES.</p> <p>Develop draft HBT Report using findings and results of the condition assessment and routine inspections. The HBT report should include: estimated construction costs for feasible alternatives using TxDOT's unit costs and; estimated demolition cost, if federally funded. Develop draft HBT Report in partnership with ENV HIST, District EC/ES, and District BrgE/DesE.</p> <p>Request a scoping meeting and site visit.</p>	<p>2 hours over 2 weeks</p> <p>40 hours over 1 month</p>

**PART 2 – HISTORIC BRIDGE PROGRAMMATIC SECTION 4(F) DOCUMENTATION STANDARDS (APPENDICIES)**

Process Step	Responsible Party	Action	Duration
4.	HBT (BRG PM; District BrGE/ DesE/ EC/ES; and ENV HIST)  Auxiliary HBT members (as needed)	Attend scoping meeting and site visit to: discuss findings of the condition assessment and structural alternatives available to the historic bridge; discuss roadway geometry, site constraints, traffic demand, type of traffic, and local needs; identify additional information for HBT and NEPA documents; develop a plan for moving the project forward through the project development process and establish a project timeline and action items. Depending on the historic bridge being evaluated, the BRG DesE, BRG C/M and THC are strongly encouraged to attend scoping meeting and site visit.	1 day (held within 1 month of receipt of HBT report)
5.	District BrGE	Coordinate with local government to explain condition of the historic bridge and potential structural alternatives. Develop and obtain Off-System Advanced Funding Agreement.	6 hours over 2 months
6.	District EC/ES  ENV HIST:  District EC/ES and ENV HIST  BRG PM  ENV HIST	NEPA documentation: Revise Need and Purpose statement based on structural and functional project constraints Develop Section 4(f) documentation, as required, according to the guidance in this document. OR Acquire and manage consultant work authorization for the development of the Section 4(f) documentation. Manage additional historical studies report production, as required. Develop a public involvement plan to meet Section 106 requirements, if needed. See TxDOT's Historic Resources Toolkit for more information. Prepare public meeting handouts, if needed. Finalize draft HBT Report based on results of scoping meeting, site conditions, and revised Need and Purpose statement. Transmit draft HBT Report to ENV HIST for review. 12 hours over 1 week Review and provide comments for draft HBT Report	2 months (+ 18 hours for review)  2 weeks to obtain work authorization + 3 months (+18 hours over the 3 months for ENV HIST to review and comment) 15 hours over 3 months 12 hours over 1 week One day
7.	District EC/ES and/or ENV PDM  District EC/ES  BRG PM  District EC/ES and ENV HIST	Identify other environmental constraints (archeological, biological, wetlands, hazardous materials) per NEPA process.  Manage the development of the NEPA documentation.  Provide final signed and sealed HBT report.  Establish mitigation commitments and schedule. Conduct preliminary marketing of the historic bridge if structure is unable to meet the minimum criteria for continued vehicular use. Develop plan for implementing formal marketing efforts. More information can be found in ENV's Historic Resources Toolkit.	10 hours over 2 months  18 hours over 2 months One day  36 hours over 2 months
8.	District BrGE/DesE and/ or District EC/ES  ENV HIST	Coordinate with historic bridge owner/recipient to develop exhibits and mitigation proposals. Coordinate draft exhibits with BRG PM and ENV HIST. Conduct informal Section 106/Section 4(f) regulatory coordination process with SHPO, Historic Bridge Foundation (HBF), and other consulting parties, as needed.	18 hours over 1 month  15 hours over 3 months

**PART 2 – HISTORIC BRIDGE PROGRAMMATIC SECTION 4(F) DOCUMENTATION STANDARDS (APPENDICIES)**

<b>Process Step</b>	<b>Responsible Party</b>	<b>Action</b>	<b>Duration</b>
9.	ENV HIST  District EC/ES  District BrgE/DesE and/or District EC/ES BRG PM  BRG DesE	Perform technical review of Section 4(f) documentation. Coordinate partial execution of a Memorandum of Agreement (MOA), as necessary.  Conduct formal “marketing,” if required.  Coordinate the development of the structural plans based on the scope outlined in the Amendment, HBT report and/or Section 4(f) alternative analysis.  Develop structural details and specifications, as needed.	14 working days  30 to 90 calendar days, at a minimum 2 hours over 2 weeks  2 to 6 months based on complexity of historic bridge and extent of rehabilitation
10.	ENV HIST	Review preliminary draft Section 4(f) Programmatic Checklist	4 hours over 1 week
11.	District BrgE/DesE/EC/ES  ENV HIST  BRG PM	Provide mitigation proposal as needed  Conduct Section 106 regulatory coordination process with SHPO, Historic Bridge Foundation (HBF), and other consulting parties (as needed). Submit MOA for signatures, as needed.  Provide technical support during coordination process, including presenting 60% structural plans, as required.	30 calendar days (legal sufficiency)
12.	SHPO	Review final Section 4(f) Programmatic Checklist.	20 calendar days (14 additional days if revisions to Section 4(f) documents are required)
13.	District EC/ES	Complete NEPA documentation, integrating out-come of Section 106 coordination process and Section 4(f) findings.	30 calendar days
14.	District EC/ES or ENV PM ENV HIST	Coordinate NEPA documentation (Section 4(f), etc.).  Review and manage final ENV approval of Section 4(f) documentation.	30 calendar days
15.	District EC/ES	Finalize NEPA documentation and schedule public meeting/hearing.	Up to 2 months
16.	ENV	Issue project final approval	30 to 60 calendar days



## APPENDIX C

### Examples of Purpose and Need Statements and Questions to Consider

#### EXAMPLE OF INCOMPLETE PURPOSE AND NEED STATEMENT

The purpose and need for this project is to provide a safe and efficient crossing over No Name Creek along CR 1234 that meets the current and future needs. TxDOT Bridge Division performed a condition evaluation of the No Name Creek bridge. The bridge has a sufficiency rating of 24.0 and must be replaced.

#### EXAMPLE OF COMPLETE PURPOSE AND NEED STATEMENT

The purpose of the proposed project is to provide a safer and more functional crossing of No Name Creek on CR 1234 that meets current safety and design standards. The project is needed because the load posting of 21,000 pounds is limiting for current emergency vehicle access (such as firetrucks), the guardrail does not meet safety standards as it has not been crash-tested by an accredited test facility meeting the Manual for Assessing Safety Hardware (MASH) criteria or evaluated as equivalent to a guardrail meeting MASH criteria, and the bridge is in poor condition. In addition, a planned wind farm will be moving to the area, with the potential for other wind farms that would also utilize the crossing. The development of wind farms would require the use of semi-trucks and tractor trailers with oversized beds. Wind turbine assemblies exceed the posted load for the bridge. Some of the more serious deficiencies are discussed below.

#### LIST OF QUESTIONS TO CONSIDER

Below is a list of overarching questions to consider when writing the purpose and needs statement. For more specific questions to help guide you when writing the purpose and needs statement, please see Tables 4, 5, and 6 below:

- Why must the project be completed?
- What problem(s) will the proposed action address?
- How/why is the proposed action defensible and warranted?
- What are the bridge's structural deficiencies, functional inadequacies, and/or geometric deficiencies?
- What are the existing conditions of the bridge?
- What needs have been identified by the project engineers for this specific project?
- What is the sufficiency rating of the bridge?

Note: Only discuss and include information regarding the needs identified by project engineers for your specific project. In this example, the bridge only has structural deficiencies and functional inadequacies, therefore there is no discussion of geometric deficiencies in the Purpose and Need Statement.

## PART 2 – HISTORIC BRIDGE PROGRAMMATIC SECTION 4(F) DOCUMENTATION STANDARDS (APPENDICIES)

Table 5. Structural Deficiencies

Physical Condition					
Questions	HBT Report	Condition Evaluation	Bridge Inspection Reports	TxDOT Engineering PM	Other
What superstructure and/or substructure members/elements are in poor physical condition or are deteriorated?	X	X	X	X	
Are there fracture critical members of this bridge that require immediate attention/action? If so, what are the members and what are the issues requiring immediate attention/action?	X	X	X	X	
Why do the members/elements that are in poor physical condition/deteriorated require repair or replacement?	X	X	X	X	
How was it determined that these bridge members/elements require repair or replacement?	X	X		X	
According to the most recent bridge inspection report, what are the condition ratings for the members/elements that require repair or replacement?			X		
Are there TxDOT standards that dictate that these bridge members/elements require repair or replacement? If so, what are they?	X			X	TxDOT Bridge Project Development Manual
How do the bridge's current condition ratings compare to the TxDOT standards identified in answer to previous question?	X		X	X	
Does the railing need to be replaced? If so, why does it need to be replaced?	X			X	
What are the consequences if the bridge was closed?	X		X	X	Traffic engineer
How long is a detour route around the bridge?					BID; roadway maps, Area office engineer
Can the detour route handle similar traffic and vehicles as the existing bridge?					Bridge Inspection reports for bridge(s) on detour route to review current load ratings; traffic studies; local planning efforts
Do school buses, emergency vehicles, or oversized vehicles need to use the bridge?	X			X	Area office engineer; city/county officials; traffic studies; local planning efforts

PART 2 – HISTORIC BRIDGE PROGRAMMATIC SECTION 4(F) DOCUMENTATION STANDARDS (APPENDICIES)

Hydraulic Problems Causing Scour and/or Substructure Deterioration					
Questions	HBT Report	Condition Evaluation	Bridge Inspection Reports	TxDOT Engineering PM	Other
What superstructure and/or substructure members/elements are deteriorated due to hydraulic problems?	X	X	X	X	
How was is determined that these bridge members/elements require repair or replacement?	X	X	X	X	
According to the most recent bridge inspection report, what are the condition ratings for the members/elements that require repair or replacement?			X		
Are there TxDOT standards that dictate that these bridge members/elements require repair or replacement? If so, what are they?	X			X	TxDOT Bridge Project Development Manual
What is causing the scour or substructure deterioration?	X	X	X	X	Hydraulics engineer
Is the flow in the channel causing the scour and/or deterioration? If so, how?	X	X	X	X	Hydraulics engineer
Is a modification required to the channel or streambed? If so, how would the channel or streambed be modified?	X			X	Hydraulics engineer
What are the consequences if the bridge was closed?	X		X	X	Traffic engineer
How long is a detour route around the bridge?					BID; roadway maps; Area office engineer
Can the detour route handle similar traffic and vehicles as the existing bridge?				X	Bridge Inspection reports for bridge(s) on detour route to review current load ratings; traffic studies; local planning efforts
Do school buses, emergency vehicles, or other oversized vehicles need to use the bridge?	X				Area office engineer; city/county officials; traffic studies; local planning efforts

PART 2 – HISTORIC BRIDGE PROGRAMMATIC SECTION 4(F) DOCUMENTATION STANDARDS (APPENDICIES)

Load Capacity of Bridge is too Low					
Questions	HB Report	Condition Evaluation	Bridge Inspection Reports	TxDOT Engineering PM	Other
What is the current load rating of the bridge?	X		X		BID
What load was the bridge originally designed to carry?	X		X		As-built plans for the subject bridge
What is the minimum load capacity required for the roadway as dictated by TxDOT standards?	X			X	TxDOT Bridge Project Development Manual; TxDOT Historic Bridge Manual
What member/elements of the bridge are causing the low load capacity rating?	X	X	X	X	
Is the bridge load posted?	X		X		Site visit
Are vehicles that exceed the bridge's current load rating using the bridge?	X			X	Area office engineer; city/county officials
What types of vehicles are these?	X			X	Area office engineer; city/county officials
What type of damage is the bridge sustaining when heavier vehicles use the bridge?	X	X	X	X	
What are the consequences if the bridge was closed?	X		X	X	Traffic engineer
How long is a detour route around the bridge?					BID; roadway maps; Area office engineer
Can the detour route handle similar traffic and vehicles as the existing bridge?				X	Bridge Inspection reports for bridge(s) on detour route to review current load ratings; traffic studies; local planning efforts
Do school buses, emergency vehicles, or oversized vehicles need to use the bridge?					Area office engineer; city/county officials; traffic studies; local planning efforts

Table 6. Functional Inadequacies

Bridge poses horizontal clearance restrictions					
Questions	HB Report	Condition Evaluation	Bridge Inspection Reports	TxDOT Engineering PM	Other
What types of vehicles are using the structure?	X			X	Area office engineer, site visit (If needed, determine what types of vehicles use road based on surrounding property types)



PART 2 – HISTORIC BRIDGE PROGRAMMATIC SECTION 4(F) DOCUMENTATION STANDARDS (APPENDICIES)

Bridge poses horizontal clearance restrictions					
Have there been accidents at the bridge? If so, how many and in what time period?	X			X	Area office engineer; traffic engineer; accident statistics, if available
Is the bridge sustaining damage from vehicles using the bridge? If so, what elements of the bridge have been impacted?	X	X	X	X	
Do damaged members pose a safety hazard or cause a reduced load capacity of the bridge?	X	X	X	X	
How long is a detour route around the bridge for wide vehicles?	X				BID; roadway maps; Area office engineer
Can bridges on the detour route handle wide vehicles?	X				Site visit, Bridge Inspection reports for bridge(s) on detour route
Does width restriction cause school buses and emergency vehicles to avoid using the bridge?	X			X	Area office engineer

Bridge is narrower than roadway					
Questions	HBT Report	Condition Evaluation	Bridge Inspection Reports	TxDOT Engineering PM	Other
Is problem caused by bridge having narrow or no shoulders, or does problem stem from bridge having fewer or narrower lanes than roadway?	X		X	X	Traffic engineer; roadway engineer
Do lanes have to merge at each bridge approach? If so, does this cause traffic delays?	X			X	Traffic engineer; site visit
Has the disparity between the roadway width and bridge caused accidents? If so, how many and in what time period?	X			X	Area office engineer; traffic engineer; accident statistics, if available
If so, have accidents damaged the bridge?	X	X	X	X	
Can bridge be used as part of a one-way pair?	X	X		X	

Roadway is being upgraded and bridge is too narrow for the upgraded facility					
Questions	HBT Report	Condition Evaluation	Bridge Inspection Reports	TxDOT Engineering PM	Other
Are there TxDOT standards that require the road to be upgraded? If so, what are they?				X	Area office engineer; TxDOT Roadway Design Manual
What is the bridge's width compared to the TxDOT standard?	X			X	
Can road be tapered to the width of the historic bridge?	X			X	Traffic engineer; roadway designer

**PART 2 – HISTORIC BRIDGE PROGRAMMATIC SECTION 4(F) DOCUMENTATION STANDARDS (APPENDICIES)**

Roadway is being upgraded and bridge is too narrow for the upgraded facility					
If not, why can't the road be tapered?	X			X	Traffic engineer; roadway designer
Can bridge be used as part of a one-way pair?	X	X		X	
Can a design exception be obtained to keep the bridge in service for the upgraded roadway? If not, why?				X	Traffic engineer; roadway designer

Bridge poses vertical clearance restrictions					
Questions	HBT Report	Condition Evaluation	Bridge Inspection Reports	TxDOT Engineering PM	Other
What is causing the vertical clearance restrictions?	X			X	
What is the TxDOT standard that dictates the vertical clearance requirements?	X			X	TxDOT Roadway Design Manual; TxDOT Bridge Project Development Manual
What is the bridge's vertical clearance, compared to the TxDOT standard?	X			X	
What type of vehicles cannot use the bridge due to vertical restrictions?	X				Area office engineer, site visit (If needed, determine what types of vehicles use road based on surrounding property types, land uses)
Do school buses or emergency vehicles use the bridge?	X			X	Area office engineer
Do the height restrictions cause school buses and emergency vehicles to avoid using the bridge?	X			X	Area office engineer
Has bridge sustained damage when tall vehicles use the bridge? If so, what type of damage has it caused?	X	X	X	X	
How long is a detour route around the bridge?					BID; roadway maps
Can the detour route handle similar vehicles as the existing bridge?				X	Bridge Inspection reports for bridge(s) on detour route to review current vertical clearances

Water overtops deck during high water events, requiring periodic closure of the bridge					
Questions	HBT Report	Condition Evaluation	Bridge Inspection Reports	TxDOT Engineering PM	Other
How often does water overtop bridge deck during high water events?	X			X	Area office engineer

PART 2 – HISTORIC BRIDGE PROGRAMMATIC SECTION 4(F) DOCUMENTATION STANDARDS (APPENDICIES)

Water overtops deck during high water events, requiring periodic closure of the bridge					
Was the bridge designed too low to the waterway?	X		X	X	Hydraulics engineer
Was the bridge designed to be overtopped?	X			X	
What has changed to make this condition unacceptable? Is it a TxDOT standard, FEMA requirement, or other circumstances such as safety considerations?	X			X	Hydraulics engineer
What are the consequences when bridge is closed during flood events?	X		X	X	
Has the bridge sustained damage during flood events?	X	X	X	X	
How long is a detour route around the bridge?					BID; roadway maps
Can the detour route handle similar vehicles as the existing bridge?				X	Bridge Inspection reports for bridges(s) on detour route to review current vertical clearances
Do school buses or emergency vehicles need to use the bridge?	X				Area office engineer

Bridge acts as a dam in high flood events and floods properties upstream					
Questions	HBT Report	Condition Evaluation	Bridge Inspection Reports	TxDOT Engineering PM	Other
What specifically causes the bridge to act as a dam?	X		X	X	Hydraulics engineer
When bridge acts like a dam, what types of safety hazards does that situation pose?	X		X	X	Area office engineer
How many times has the bridge caused flooding of properties upstream?	X		X	X	Area office engineer; hydraulics engineer
How much does the bridge increase flooding upstream in relation to how much flooding would occur with a new bridge in place?	X		X	X	Hydraulics engineer; FEMA rating maps
What types of properties are upstream?					Site visit; aerial photographs; topographic maps
Does flooding impact vacant land or buildings?					Site visit; aerial photographs; topographic maps
Are buildings upstream in the existing 100-year floodplain?					FEMA rating maps; hydraulics engineer
Can the detour route handle similar vehicles as the existing bridge?				X	Bridge Inspection reports for bridges(s) on detour route to review current vertical clearances
Do school buses or emergency vehicles need to use the bridge?	X				Area office engineer

## PART 2 – HISTORIC BRIDGE PROGRAMMATIC SECTION 4(F) DOCUMENTATION STANDARDS (APPENDICIES)

Table 7. Geometric Deficiencies

Poor line of sight approaching the bridge					
Questions	HBT Report	Condition Evaluation	Bridge Inspection Reports	TxDOT Engineering PM	Other
What circumstances cause poor line of sight approaching the bridge?	X			X	Area office engineer; traffic engineer
Has poor line of sight caused accidents? If so, how many and in what time period? Where are the accidents occurring?	X				Area office engineer; traffic engineer; accident statistics, if available
Has bridge sustained damage from these accidents? If so, what type of damage has it caused?	X	X	X	X	
What causes poor line of sight – man made obstacles or natural features?	X		X	X	Area engineer; site visit
Do school buses or emergency vehicles use the bridge?	X			X	Area office engineer
How long is a detour route around the bridge?					BID; roadway maps

Access to surrounding properties					
Questions	HBT Report	Condition Evaluation	Bridge Inspection Reports	TxDOT Engineering PM	Other
How has access to surrounding properties been limited or blocked?	X			X	Area office engineer; traffic engineer
What properties have limited or no access due to the presence of the bridge?	X				Site visit
Have properties always had limited or blocked access?					Historical maps and/or historical aerial photographs
Do travelers ignore traffic rules to access the properties?	X				Site visit; area office engineer; traffic engineer; accident statistics, if available
Have accidents occurred due to limited or no access to surrounding properties? If so, how many and in what time period?	X			X	Area office engineer; traffic engineer; accident statistics, if available
Can emergency vehicles access the properties?				X	Area office engineer; traffic engineer; site visit




At least one of the approaches has a curve that is too sharp					
Questions	HBT Report	Condition Evaluation	Bridge Inspection Reports	TxDOT Engineering PM	Other






PART 2 – HISTORIC BRIDGE PROGRAMMATIC SECTION 4(F) DOCUMENTATION STANDARDS (APPENDICIES)

At least one of the approaches has a curve that is too sharp					
What issues/problems does the sharp curve cause for vehicles using the bridge?	X			X	Area office engineer; traffic engineer
Has the sharp curve caused accidents at/near the bridge? If so, how many and in what time period?	X			X	Area office engineer; traffic engineer; accident statistics, if available
What type of vehicles cannot use the bridge due to the roadway curvature?	X			X	Area office engineer; site visit (if needed, determined what types of vehicles use road based on surrounding property types, land uses); local traffic data, if available
Do emergency vehicles and school buses avoid using the bridge? If so, what impact does this have on surrounding properties?	X			X	Area office engineer; traffic engineer
Are there properties that have limited or no access due to sharp curve? If so, which ones?	X			X	Area office engineer; site visit
Is realignment of road required?	X			X	Roadway engineer

Table 8. Illustrations to Help Demonstrate Need

Type of need	Illustrations to help demonstrate need	Example
<b>Structural deficiencies</b>		
Physical condition	Photographs of deteriorated or damaged elements of the bridge	
Hydraulic problems causing scour and/or substructure deterioration	Photographs of scour and/or substructure deterioration	
Load capacity	Photographs of vehicles using bridge that exceed posted load, if available Photographs showing specific bridge members/elements that cause low load capacity, if applicable	<p>Weight Range of Cement Truck: Empty 26,000 lbs. - Full 66,000 lbs.</p> 

PART 2 – HISTORIC BRIDGE PROGRAMMATIC SECTION 4(F) DOCUMENTATION STANDARDS (APPENDICIES)

Type of need	Illustrations to help demonstrate need	Example
<b>Functional inadequacies</b>		
Bridge poses horizontal clearance restrictions	Photographs of damaged bridge members caused by wide loads, if available Photographs showing the width of the road in relation to the width of the bridge	
Bridge is narrower than the roadway	Typical sections of existing roadway and existing bridge Aerial photographic maps or photographs showing the disparity between the roadway and bridge width	
Roadway is being upgraded and bridge is too narrow for the upgraded facility	Typical section of proposed roadway and typical section of existing bridge	
Bridge poses vertical clearance restrictions	Photographs showing the elements that cause the vertical clearance restrictions Photographs of damaged bridge members caused by vehicles that were too tall, if available	
Water overtops bridge deck during high water events, requiring periodic closure of the bridge	Photographs of water overtopping bridge deck, if possible	
Bridge acts as a dam in high flood events and floods properties upstream	Photographs of bridge acting as a dam during a high flood event, if possible Topographic map or aerial photograph illustrating water flow during high water events with the bridge in place, if available	
Poor line of sight approaching the bridge	Photographs illustrating the poor line of sight	
Access to surrounding properties is limited or blocked	Photographs or labeled aerial maps showing relationship between the bridge and the properties that have limited or no access	
At one of the approaches, the curve is too sharp	Photographs or labeled aerial maps illustrating the turning radius	

# APPENDIX D

## Alternative Questions

### 1. No Build Alternative

The no build alternative should begin by stating that this alternative means that no federal funds will be expended and that the proposed action would not occur. It should be noted that the no build alternative is an avoidance alternative since it would not use the historic bridge. The evaluation should consider all consequences of proceeding with the no build alternative to determine if it is feasible and prudent. The following list outlines the type of details that should

be included in the analysis of the no build alternative, the questions the author should ask, and the sources that may have the answers to these questions.

Each project has unique circumstances and existing conditions; therefore, the questions below are sample questions to ascertain the type of information that should be included for most projects. However, additional issues may need to be addressed to adequately investigate the no build alternative.

Table 9. No Build Alternative Questions

1. No Build Alternative		
Information to be included	Questions to ask	Source
Needs as identified in the purpose and need statement explained in detail	–	Purpose and need statement
Short term and long-term implications of performing routine maintenance	Who will perform maintenance on the bridge? Can the bridge remain open in the short term if routine maintenance is performed? Can the bridge remain open in the long term if routine maintenance is performed? Will maintaining the bridge in its current state pose safety issues to the traveling public? What is the cost of routine maintenance?	Purpose and need statement, HBT report, condition assessment, engineering project manager
Detour route around bridge	If detour route must be used, how long is it? How will detour route impact the traveling public? Will school buses or emergency vehicles have to use the detour route? What impacts will detour route have to residents near the bridge?	Purpose and need statement

## PART 2 – HISTORIC BRIDGE PROGRAMMATIC SECTION 4(F) DOCUMENTATION STANDARDS (APPENDICIES)

Once the questions above are answered, outline how the needs of the project (as stated in the purpose and need statement) will or will not be addressed by this alternative. Remember, the argument should always relate back to the established purpose and need statement.

### 2. Bypass Alternative

Bypass alternatives should also be considered as part of the alternatives analysis since they avoid the use of the historic bridge. Two bypass (avoidance) alternatives should be considered as part of Historic Bridge Programmatic Section 4(f) Evaluations:

- A. Bypass Alternative – Constructing a New Bridge on a New Alignment and Monumenting Historic Bridge
- B. Bypass Alternative – Continued Vehicular Use as a One-Way Pair

#### 2A. Bypass Alternative - Constructing a New Bridge on a New Alignment and Monumenting Historic Bridge

This alternative involves the construction of a new bridge

adjacent to the historic bridge. Discussion of this bypass alternative should begin by stating that this alternative is an avoidance alternative since it would not use the historic bridge. The description of this alternative should include detailed information regarding the placement of the new bridge in relation to the existing bridge, the appearance of the new bridge, issues with hydraulics and water flow with the existing and new bridge in place, the amount of right-of-way required, information regarding the future maintenance of the historic bridge, and the cost of the alternative.

The following list outlines the type of details that should be included in the analysis of this alternative, the questions the author should ask, and the sources that may have the answers to these questions.

Each project has unique circumstances and existing conditions; therefore, the questions below are sample questions to ascertain the type of information that should be included for most projects. However, additional issues may need to be addressed to adequately investigate this alternative.

Table 10. Questions for the Bypass Alternative – Constructing a New Bridge on a New Alignment and Monumenting Historic Bridge

2A. Bypass Alternative - Constructing a New Bridge on a New Alignment		
Information to be included	Questions to ask	Source
Location of new bridge	Where exactly will the new bridge be in relation to the existing bridge? Will the new bridge be upstream or downstream from the existing bridge? Why does the new bridge have to be located on the selected side of the historic bridge? How many feet upstream or downstream will the new bridge be from the existing bridge? What hydraulic or safety issues dictate that the new bridge is put on the upstream or downstream side of the historic bridge? What other environmental resources would be impacted if the new bridge is put on the upstream or downstream side of the historic bridge? What roadway work will have to be included in the project to accommodate the new bridge or to meet TxDOT standards?	HBT report; schematics of the alternative; engineering project manager; District environmental staff; ENV Project Management staff
Appearance of the new bridge	What type of structure will the new bridge be? Will the new bridge change the setting of the existing bridge?	Engineering project manager
Hydraulic issues	How will the new and existing bridge impact the hydraulics in the waterway? How will the new and existing bridge impact flow rate, velocity, water level, and vorticity? If the new bridge is upstream from the existing bridge, will it change water flow in the channel and pose potential impacts to the existing bridge?	HBT report; hydraulic analysis; engineering project manager; hydraulic engineer
New right-of-way for new alignment	What is the amount (in acres) of new right-of-way required for this alternative?	HBT report; engineering project manager; right-of-way agent



2A. Bypass Alternative - Constructing a New Bridge on a New Alignment		
Other Section 4(f) resources	Will the new alignment pose a use of any other Section 4(f) properties?	District environmental staff; ENV Project Management staff
Maintenance of the existing bridge	What will happen to the existing bridge? If the existing bridge will be left in place as a monument, how will the bridge be maintained? What is the cost of such maintenance? Who will maintain the structure (it will not be TxDOT)? Who will be the parties to the MOA ensuring the future maintenance of the bridge if it is an off-system structure?	HBT report; engineering project manager
Cost of the alternative	What is the approximate cost of the new right-of-way? What is the basis for this estimate? What is the approximate cost for the new bridge? What is the approximate cost for the roadway work? What is the total cost of this bypass alternative, including mobilization, engineering, and contingencies? What is the breakdown of total costs?	HBT report; engineering project manager

Once the questions above are answered, outline how the needs of the project (as stated in the purpose and need statement) will or will not be addressed by this alternative. Remember, the argument should always relate back to the established purpose and need statement.

## 2B. Bypass Alternative–Continued Vehicular Use as a One-Way Pair

Discussion of this rehabilitation alternative should begin by stating that this alternative is an avoidance alternative since it does not call for a use of the historic bridge. In addition to many of the same issues that are addressed in Alternative 3A, which can be incorporated into the discussion by reference, the analysis of this alternative should include details regarding the new bridge and its appearance, location, and potential

impacts to the historic bridge. Additionally, this alternative must outline how much new right-of-way will be required, how much it costs, and how such cost estimates were established.

The following list outlines the type of details that should be included in the analysis of this alternative, the questions the author should ask, and the sources that may have the answers to these questions.

Each project has unique circumstances and existing conditions. Therefore, the questions below are sample questions to ascertain the type of information that should be included for most projects. However, additional issues may need to be addressed to adequately investigate this alternative.

Table 11. Questions for the Bypass (Avoidance) Alternative – Continued Vehicular Use as a One-Way Pair

2B Bypass Alternative - Continued Vehicular Use as a One-Way Pair		
Information to be included	Questions to ask	Source
Members/elements in need of replacement or repair	What are the superstructure or substructure members/elements that need to be repaired or replaced? Why do they need to be repaired or replaced? Are there TxDOT standards that require that the superstructure or substructure members/elements need to be repaired or replaced? If so, what are they? Does the railing need to be replaced or repaired? How would the railing be repaired? Why does the railing need to be replaced? Is there a TxDOT standard that requires the repair or replacement of the railing? Are there alternatives to the standard railing design that could be used?	Purpose and need

PART 2 – HISTORIC BRIDGE PROGRAMMATIC SECTION 4(F) DOCUMENTATION STANDARDS (APPENDICIES)

2B Bypass Alternative - Continued Vehicular Use as a One-Way Pair		
Materials and construction techniques	<p>Is it possible to replace deteriorated, cracked, or failed members, connection types, or other elements in kind?</p> <p>What types of repairs are necessary for these members, connection types, and elements?</p> <p>Can deteriorated, cracked, or failed members be repaired with additional materials bolted to it?</p> <p>If rivets have to be replaced, can they be replaced with rivets or dome-headed bolts?</p> <p>If concrete has to be repaired, how would the repairs be accomplished? Would the concrete be patched or reconstructed, or would another method be used?</p> <p>Does the bridge have to be lifted off the substructure? What is the lifting plan for the bridge?</p> <p>If bridge's superstructure and/or substructure need cleaning, how will they be cleaned?</p> <p>Does the bridge have any hazardous materials that need abatement, such as lead paint or asbestos?</p> <p>Does the bridge need to be painted? What color would the bridge be painted? How does the proposed color compare to the historic color?</p>	HBT report; engineering project manager
Bridge's load capacity and strength	<p>What is the AASHTO design standard for load capacity for the roadway type on which the project is located?</p> <p>Will the bridge's load capacity be raised to the minimum AASHTO design standard?</p> <p>If not, can a design exception be granted?</p> <p>Will school buses and emergency vehicles be able to use the bridge after rehabilitation?</p>	HBT report, engineering project manager
Appearance of the new bridge	<p>What type of structure will the new bridge be?</p> <p>Will the new bridge change the setting of the existing bridge?</p>	Engineering project manager
Hydraulic issues	<p>How will the new and existing bridges impact the hydraulics on the waterway?</p> <p>How will the new and existing bridges impact flow rate, velocity, water level, and vorticity?</p> <p>If the new bridge is upstream from the existing bridge, will it change water flow in the channel and pose potential impacts to the existing bridge?</p>	HBT report; hydraulic analysis; engineering project manager; hydraulic engineer
New right-of-way for new bridge	<p>What is the amount of new right-of-way (in acres) required for the construction of the new bridge?</p> <p>Who is responsible for acquiring the new right-of-way?</p>	HBT report; engineering project manager; right-of-way agent
Other Section 4(f) resources	<p>Will the new alignment pose a use of any other Section 4(f) properties?</p>	District environmental staff; ENV Project Management staff
Historic integrity of the bridge	<p>Will this rehabilitation alternative call for the retention of the bridge's character-defining features? If so, which features?</p> <p>Does this rehabilitation alternative follow the SOI Standards?</p>	ENV Historical Studies staff
Cost of the alternative	<p>What is the approximate cost for the rehabilitation work?</p> <p>What is the approximate cost of the new structure?</p> <p>What is the approximate cost for the roadway work?</p> <p>What is the approximate cost of the new right-of-way? What is the cost estimate based upon?</p> <p>What is the approximate cost of cleaning and painting the bridge, if applicable?</p> <p>What is the total cost of this rehabilitation alternative, including mobilization, engineering, and contingencies? What is the breakdown of total cost?</p>	HBT report; engineering project manager

Once the questions above are answered, outline how the needs of the project (as stated in the purpose and need statement) will or will not be addressed by this alternative. Remember, the argument should always relate back to the established purpose and need statement.

3. Rehabilitation Alternatives

Rehabilitation alternatives that do not affect the historic integrity of the historic bridge must be considered as part of the alternatives analysis. Remember that according to FHWA guidance, if the historic integrity of the bridge is not affected, there is no use of that historic bridge. The historic integrity of a bridge is not affected when the character-defining features of the bridge are maintained, and the Secretary of the Interior (SOI) Standards for Rehabilitation have been followed. Determining if the rehabilitation alternative affects the bridge’s historic integrity is done in consultation between TxDOT, the Texas SHPO, and other consulting parties under the National Historic Preservation Act.

AASHTO’s Guidelines for Historic Bridge Rehabilitation and Replacement provide procedures for defining when rehabilitation of a historic bridge is feasible and prudent based on engineering data and analysis. Since the Guidelines for Historic Bridge Rehabilitation and Replacement provide detailed information regarding rehabilitation of historic structures, it should be utilized by the Historic Bridge Team and the Engineering Project Manager when assessing the rehabilitation alternatives.

The Rehabilitation (avoidance) alternatives are the most desirable alternative for the long-term preservation of the historic bridge. Since the Texas SHPO reviews information for this alternative very carefully, discussions regarding such alternatives must be thorough.

Two rehabilitation (avoidance) alternatives should be considered as part of Historic Bridge Programmatic Section 4(f) Evaluations:

- A. Rehabilitation (avoidance) alternative – continued vehicular use carrying two-way traffic
- B. Rehabilitation (avoidance) alternative – pedestrian use in a new location

3A. Rehabilitation (Avoidance) Alternative - Continued Vehicular Use Carrying Two-Way Traffic

Discussion of this rehabilitation alternative should begin by stating that this alternative is an avoidance alternative since it does not call for a use of the historic bridge. The document should describe the members or elements that are in need of replacement or repair, the materials and construction techniques that will be used in the rehabilitation, the bridge’s load capacity before and after the rehabilitation, how the bridge will serve traffic following the rehabilitation, how the rehabilitation does not affect the historic integrity of the bridge, and the cost of the alternative.

The following list outlines the type of details that should be included in the analysis of this alternative, the questions the author should ask, and the sources that may have the answers to these questions. Please note that each project has unique circumstances and existing conditions; therefore, the questions below are sample questions to ascertain the type of information that should be included for most projects. However, additional issues may need to be addressed to adequately investigate this alternative.

Table 12. Questions for the Rehabilitation (Avoidance) Alternative – Continued Vehicular Use Carrying Two-Way Traffic

3A. Rehabilitation (Avoidance) Alternative - Continued Vehicular Use Carrying Two-Way Traffic		
Information to be included	Questions to ask	Source
Members/elements in need of replacement or repair	What are the superstructure or substructure members/elements that need to be repaired or replaced? Why do they need to be repaired or replaced? Are there TxDOT standards that require that the superstructure or substructure members/elements need to be repaired or replaced? If so, what are they? Does the railing need to be replaced or repaired? How would the railing be repaired? Why does the railing need to be replaced? Is there a TxDOT standard that requires the repair or replacement of the railing? Are there alternatives to the standard railing design that could be used?	Purpose and need

<b>3A. Rehabilitation (Avoidance) Alternative - Continued Vehicular Use Carrying Two-Way Traffic</b>		
Materials and construction techniques	<p>Is it possible to replace deteriorated, cracked, or failed members, connection types, or other elements in kind?</p> <p>What types of repairs are necessary for these members, connection types, and elements?</p> <p>Can deteriorated, cracked, or failed members be repaired with additional materials bolted to it?</p> <p>If rivets have to be replaced, can they be replaced with rivets or dome-headed bolts?</p> <p>If concrete has to be repaired, how would the repairs be accomplished? Would the concrete be patched or reconstructed, or would another method be used?</p> <p>Does the bridge have to be lifted off the substructure? What is the lifting plan for the bridge?</p> <p>If bridge's superstructure and/or substructure need cleaning, how will they be cleaned?</p> <p>Does the bridge have any hazardous materials that need abatement, such as lead paint or asbestos?</p> <p>Does the bridge need to be painted? What color would the bridge be painted? How does the proposed color compare to the historic color?</p>	HBT report; engineering project manager
Bridge's load capacity and strength	<p>What is the AASHTO design standard for load capacity for the roadway type on which the project is located?</p> <p>Will the bridge's load capacity be raised to the minimum AASHTO design standard?</p> <p>If not, can a design exception be granted?</p>	HBT report, engineering project manager
Traffic needs	<p>Can the bridge safely handle two-way traffic after rehabilitation?</p> <p>Will school buses and emergency vehicles be able to use the bridge after rehabilitation?</p>	HBT report, engineering project manager
Historic integrity of the bridge	<p>Will this rehabilitation alternative call for the retention of the bridge's character-defining features? If so, which features?</p> <p>How does this rehabilitation alternative follow the SOI Standards?</p>	ENV Historical Studies staff
Cost of the alternative	<p>What is the approximate cost for the rehabilitation work?</p> <p>What is the cost of cleaning and painting the bridge, if applicable?</p> <p>What is the total cost of this rehabilitation alternative, including mobilization, engineering, and contingencies? What is the breakdown of the total cost?</p>	HBT report; engineering project manager

Once the questions above are answered, outline how the needs of the project (as stated in the purpose and need statement) will or will not be addressed by this alternative. Remember, the argument should always relate back to the established purpose and need statement.

### **3B. Rehabilitation Alternative – Pedestrian Use**

Discussion of this rehabilitation alternative should begin by stating that this alternative is an avoidance alternative since it does not call for a use of the historic bridge. Since this alternative calls for the rehabilitation of the historic bridge and the construction of a new bridge, many of the same issues that are covered by Alternative 2B must also be included or referenced in the analysis of this alternative. It is important to

note that load capacity and safety requirements for pedestrian bridges are not the same as vehicular bridges. As a result, additional information regarding pedestrian load ratings and railings should be included in the discussion of this alternative.

The following list outlines the type of details that should be included in the analysis of this alternative, the questions the author should ask, and the sources that may have the answers to these questions. Please note that each project has unique circumstances and existing conditions; therefore, the questions below are sample questions to ascertain the type of information that should be included for most projects. However, additional issues may need to be addressed to adequately investigate this alternative.



## PART 2 – HISTORIC BRIDGE PROGRAMMATIC SECTION 4(F) DOCUMENTATION STANDARDS (APPENDICIES)

Table 13. Questions for the Rehabilitation (Avoidance) Alternative – Pedestrian Use

3B. Rehabilitation Alternative–Pedestrian Use		
Information to be included	Questions to ask	Source
Members/elements in need of replacement or repair	<p>What are the superstructure or substructure members/elements that need to be repaired or replaced?</p> <p>Why do they need to be repaired or replaced?</p> <p>Are there TxDOT standards that require that the superstructure or substructure members/elements need to be repaired or replaced? If so, what are they?</p> <p>Does the railing need to be replaced or repaired? How would the railing be repaired? Why does the railing need to be replaced?</p> <p>Is there a TxDOT standard that requires the repair or replacement of the railing?</p> <p>Are there alternatives to the standard railing design that could be used?</p>	Purpose and need
Materials and construction techniques	<p>Is it possible to replace deteriorated, cracked, or failed members, connection types, or other elements in kind?</p> <p>What types of repairs are necessary for these members, connection types, and elements?</p> <p>Can deteriorated, cracked, or failed members be repaired with additional materials bolted to it?</p> <p>If rivets have to be replaced, can they be replaced with rivets or dome-headed bolts?</p> <p>If concrete has to be repaired, how would the repairs be accomplished? Would the concrete be patched or reconstructed, or would another method be used?</p> <p>Does the bridge have to be lifted off the substructure? What is the lifting plan for the bridge?</p> <p>If bridge's superstructure and/or substructure need cleaning, how will they be cleaned?</p> <p>Does the bridge have any hazardous materials that need abatement, such as lead paint or asbestos?</p> <p>Does the bridge need to be painted? What color would the bridge be painted? How does the proposed color compare to the historic color?</p>	HBT report; engineering project manager
Location of new bridge	<p>Where exactly will the new bridge be in relation to the existing bridge?</p> <p>Will the new bridge be upstream or downstream from the existing bridge?</p> <p>What hydraulic or safety issues dictate that the new bridge is put on the upstream or downstream side of the historic bridge?</p> <p>What other environmental resources would be impacted if the new bridge is put on the upstream or downstream side of the historic bridge?</p> <p>How many feet upstream or downstream will the new bridge be from the existing bridge?</p> <p>What roadway work will have to be included in the project to accommodate the new bridge or to meet TxDOT standards?</p>	HBT report; schematics of the alternative; engineering project manager
Appearance of the new bridge	<p>What type of structure will the new bridge be?</p> <p>Will the new bridge change the setting of the existing bridge?</p>	Engineering project manager
Hydraulic issues	<p>How will the new and existing bridges impact the hydraulics on the waterway?</p> <p>How will the new and existing bridges impact flow rate, velocity, water level, and vorticity?</p> <p>If the new bridge is upstream from the existing bridge, will it change water flow in the channel and pose potential impacts to the existing bridge?</p>	HBT report; hydraulic analysis; engineering project manager; hydraulic engineer
New right-of-way for new bridge	<p>What is the amount of new right-of-way (in acres) required for the construction of the new bridge?</p>	HBT report; engineering project manager; right-of-way agent

## PART 2 – HISTORIC BRIDGE PROGRAMMATIC SECTION 4(F) DOCUMENTATION STANDARDS (APPENDICIES)

3B. Rehabilitation Alternative–Pedestrian Use		
Other Section 4(f) resources	Will the new alignment pose a use of any other Section 4(f) properties?	District environmental staff; ENV Project Management staff
Use as pedestrian bridge	What type of protective railing or fencing needs to be added to the bridge for pedestrian or bicycle use? Is there a local interest or need for a pedestrian bridge at this location? Are there existing facilities (sidewalks, trail systems, other pedestrian walkways, and/or parks) or plans for future facilities, nearby the historic bridge that promote the structure's use as a pedestrian bridge?	Engineering project manager; area office engineer; site visit
Historic integrity of the bridge	Will this rehabilitation alternative call for the maintenance of the bridge's character-defining features? If so, which features? Does this rehabilitation alternative follow the SOI Standards?	ENV Historical Studies staff
Maintenance of the existing bridge	Who will perform maintenance on the structure? Who will be the parties to the two- or three-party agreement ensuring the future maintenance of the bridge if it is an off-system structure?	HBT report; engineering project manager
Cost of the alternative	What is the approximate cost for the rehabilitation work? What is the approximate cost of painting and cleaning the bridge, if applicable? What is the approximate cost for the protective railing? What is the approximate cost of the new structure? What is the approximate cost for the roadway work? What is the approximate cost of the new right-of-way? What is the cost estimate based upon? What is the cost of this rehabilitation alternative, including mobilization, engineering, and contingencies? What is the breakdown of total cost?	HBT report; engineering project manager

Once the questions above are answered, outline how the needs of the project (as stated in the purpose and need statement) will or will not be addressed by this alternative. Remember, the argument should always relate back to the established purpose and need statement.

### 4. Rehabilitation (Use) Alternative

Discussion of this rehabilitation alternative should begin by stating that this alternative is a use alternative since it would affect the historic integrity of the historic bridge. Since this alternative calls for the rehabilitation of the historic bridge, many of the same issues that are covered by Alternative 3 must also be included in the analysis of this alternative.

The following list outlines the type of details that should be included in the analysis of this alternative, the questions the author should ask, and the sources that may have the answers to these questions. Please note that each project has unique circumstances and existing conditions; therefore, the questions below are sample questions to ascertain the type of information that should be included for most projects. However, additional issues may need to be addressed to adequately investigate this alternative.

## PART 2 – HISTORIC BRIDGE PROGRAMMATIC SECTION 4(F) DOCUMENTATION STANDARDS (APPENDICIES)

Table 14. Questions for the Rehabilitation of the Historic Bridge that Affects the Historic Integrity of the Historic Bridge

4. Rehabilitation of the Historic Bridge that Affects the Historic Integrity of the Historic Bridge		
Information to be included	Questions to ask	Source
Members/elements in need of replacement or repair	<p>What are the superstructure or substructure members/elements that need to be repaired or replaced?</p> <p>Why do they need to be repaired or replaced?</p> <p>Are there TxDOT standards that require that the superstructure or substructure members/elements need to be repaired or replaced? If so, what are they?</p> <p>Does the railing need to be replaced or repaired? How would the railing be repaired? Why does the railing need to be replaced?</p> <p>Is there a TxDOT standard that requires the repair or replacement of the railing?</p> <p>Are there alternatives to the standard railing design that could be used?</p>	Purpose and need
Materials and construction techniques	<p>Why can't members, connection types, or other elements be replaced in-kind?</p> <p>What types of repairs are necessary?</p> <p>If concrete has to be repaired, how would the repairs be accomplished? Would the concrete be patched or reconstructed, or would another method be used?</p> <p>Does the bridge have to be lifted off the substructure? What is the lifting plan for the bridge?</p> <p>If bridge's superstructure and/or substructure needs cleaning, how will they be cleaned?</p> <p>Does the bridge have any hazardous materials that need abatement, such as lead paint or asbestos?</p> <p>Does the bridge need to be painted? What color would the bridge be painted? How does the proposed color compare to the historic color?</p> <p>What roadway work will have to be included in the project to meet TxDOT standards?</p>	HBT report; engineering project manager
Historic integrity of the bridge	<p>Which character-defining features of the historic bridge will be modified or replaced by the rehabilitation work?</p> <p>How would rehabilitation work affect character defining features?</p> <p>In what ways does the rehabilitation work not meet the SOI Standards?</p>	ENV Historical Studies staff; HBT; engineering project manager
Bridge's load capacity and strength	<p>What is the AASHTO design standard for load capacity for the roadway type on which the project is located?</p> <p>Will the bridge's load capacity be raised to the minimum AASHTO design standard?</p> <p>If not, can a design exception be granted?</p> <p>Will school buses and emergency vehicles be able to use bridge after rehabilitation?</p>	HBT report; engineering project manager
Other Section 4(f) resources	<p>Will the new alignment pose a use of any other Section 4(f) properties?</p>	District environmental staff; ENV Project Management staff
Cost of the alternative	<p>What is the approximate cost for the rehabilitation work?</p> <p>What is the approximate cost of painting and cleaning the bridge, if applicable?</p> <p>What is the approximate cost for the roadway work?</p> <p>What is the cost of this rehabilitation alternative, including mobilization, engineering, and contingencies? What is the breakdown of total cost?</p>	HBT report; engineering project manager

## PART 2 – HISTORIC BRIDGE PROGRAMMATIC SECTION 4(F) DOCUMENTATION STANDARDS (APPENDICIES)

Once the questions above are answered, outline how the needs of the project (as stated in the purpose and need statement) will or will not be addressed by this alternative. Remember, the argument should always relate back to the established purpose and need statement.

### 5. Replace the Historic Bridge on Current Alignment

Discussion of this replacement alternative should begin by describing the replacement alternative in detail and stating that this alternative is a use alternative since it would affect the historic integrity of the bridge. The description of the alternative should describe any realignment of the roadway, new right-of-way or easements that are required by the replacement alternative, and what type of structure will

replace the existing historic bridge.

The following list outlines the type of details that should be included in the analysis of this alternative, the questions the author should ask, and the sources that may have the answers to these questions.

Each project has unique circumstances and existing conditions; therefore, the questions below are sample questions to ascertain the type of information that should be included for most projects. However, additional issues may need to be addressed to adequately investigate this alternative.

Table 15. Questions for the Replacement of the Historic Bridge

5. Replace the Historic Bridge		
Information to be included	Questions to ask	Source
Appearance of the new bridge	What type of structure will the new bridge be?	Engineering project manager
Hydraulic issues	How will the new bridge impact the hydraulics of the waterway?	HBT report; hydraulic analysis; engineering project manager; hydraulic engineer
Bridge's load capacity and strength	What will the load capacity of the new bridge be? Will school buses and emergency vehicles be able to use bridge when the new bridge is in place?	HBT report; engineering project manager
New right-of-way for new bridge	Is a realignment of the road necessary? What roadway work will have to be included in the project to meet TxDOT standards? Is new right-of-way required for replacement? What is the amount of new right-of-way (in acres) required for the construction of the new bridge? What is the approximate cost of the new right-of-way cost? What is the basis for the cost estimates?	HBT report; engineering project manager; right-of-way agent
Other Section 4(f) resources	Will the new alignment pose a use of any other Section 4(f) properties?	District environmental staff; ENV Project Management staff
Cost of the alternative	What is the estimated cost of the new structure? What is the estimated cost to demolish the existing bridge? What is the approximate cost for the roadway work? What is the total cost of this replacement alternative, including mobilization, engineering, and contingencies? What is the breakdown of total cost?	HBT report; engineering project manager

Once the questions above are answered, outline how the needs of the project (as stated in the purpose and need statement) will or will not be addressed by this alternative. Remember, the argument should always relate back to the established purpose and need statement.

### Comparative alternatives analysis chart

The Comparative alternatives analysis chart is included as an attachment in order to show comparable information regarding the avoidance and use alternatives side-by-side. See below for an example:



PART 2 – HISTORIC BRIDGE PROGRAMMATIC SECTION 4(F) DOCUMENTATION STANDARDS (APPENDICIES)

Alternative	Meets Need and Purpose for the Project?	Does the project address the following deficiencies? 1) Structural 2) Functional	Does the Alternative Use the Historic Bridge?	Costs			Social, Economic or Environmental Impacts?	Constructability/ Safety/Design Issues?
				Construction (\$)	ROW (\$)	Total cost (\$)		
No-Build	No	1) No 2) No	No	\$0	\$0	\$0	No	Yes – width of bridge is too narrow and load restrictions for emergency vehicles and oversized commercial vehicles prevalent in the project area do not meet traffic needs
Rehab existing bridge for continued use	No	1) No 2) No	No	\$623,600	\$0	\$623,600	No	Yes – rehabilitating the bridge does not address width and load needs for the project area
Rehab existing bridge for use and construct a parallel structure upstream	No	1) No 2) No	No	\$413,280 +\$223,000 (site prep for new bridge)+ \$623,600 (rehab of historic bridge)	3 acres (\$175,000)	\$1,434,880	Yes; Additional impacts to riparian zone vegetation; tree removal	Yes – rehabilitating the bridge does not address width and load needs for the project area; creates unsafe condition for oversized vehicles to cross wrong way
Rehab existing bridge for pedestrian use and construct a parallel structure upstream	Yes	1) Yes 2) Yes	No	\$413,280 +\$223,000 (site prep for new bridge) + \$616,800 (rehab for pedestrian use)	3 acres (\$175,000)	\$1,428,080	Yes; Additional impacts to riparian zone vegetation; tree removal	Yes – There is no pedestrian infrastructure along Old McDade Road nor a demand for pedestrian use along the crossing
New Location upstream with historic bridge left as a monument	Yes	1) Yes 2) Yes	No	\$413,280 +\$223,000 (site prep for new bridge)	3 acres (\$175,000)	\$811,280	Yes; Additional impacts to riparian zone vegetation; tree removal	None for new roadway bridge; historic bridge left as a monument would remain subject to deterioration and vandalism; Bastrop County unable to commit to maintenance plan
Replace the existing bridge	Yes	1) Yes 2) Yes	Yes	\$413,280	\$0	\$413,280	Yes; removal of historic bridge	None. TxDOT will move the historic bridge to a new location owned by Bastrop County.

# APPENDIX E

## Relocation Package Example



Photo of proposed location for moved bridge. Note the new location for the bridge spans a small drainage ditch..



Aerial photograph of proposed new bridge location indicated in red.



## Development Services

Robert Pugh, PE, MBA, CFM, ENV SP – Director

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**November 24, 2021**

Ms. Diana Schulze, P.E.  
Area Engineer  
TXDOT  
Bastrop Area Office  
174 Highway 21 East  
Bastrop, Texas 78602

Subject: Historic Bridge Legacy Program Reuse Proposal Checklist  
CSJ #0914-18-107  
District #14 – Austin  
Code Chart 64 #50011  
Project: Old McDade Road @ Big Sandy Creek  
NBI Structure #14-011-0-AA01-06-002  
Federal Highway Administration  
CFDA Title: Highway and Construction  
CFDA No.: 20.205  
Not Research and Development

Dear Diana:

Below are answers to the subject bridge relocation project checklist questions.

1. Name and contact information for organization/interested new owner.
  - a. Ms. Donna Snowden  
County Commissioner Pct.4 | Bastrop County  
804 Pecan St. | Bastrop, TX 78602  
(512) 581-7267 | donna.snowden@co.bastrop.tx.us | <http://www.co.bastrop.tx.us>
2. Name and contact information for structural engineer for the project.
  - a. A structural engineer is being selected through the Bastrop County RFP process to design the foundations for the relocated structure. We plan to have a selection made by March 30, 2021 and will advise TXDOT when completed. 100% design plans for the replacement bridge over Big Sandy Creek are scheduled to be completed by TXDOT in December, 2022.
3. The distance the bridge will need to be moved from its current site to the new site.
  - a. Seven miles.
4. Will the bridge be stored prior to re-use? If so, for how long?
  - a. We plan to have foundation design and construction completed to facilitate setting the relocated trusses and floor beams prior to relocation from the current site over Big Sandy Creek, so no storage is anticipated. Although not expected at this time, in the event that temporary storage is needed due to structural and paint repairs prior to placement, the location would be Bastrop County Precinct 4 Road Maintenance Yard, 704 Bull Run Road, Elgin, Texas 78621.
5. Map(s) showing the new location of the historic bridge. This could include aerial photographs, city street maps, or USGS topographic maps.
  - a. Next to Bastrop County Justice of Peace, 1125 Dildy Drive, Elgin, TX 78621. See attached map.

PART 2 – HISTORIC BRIDGE PROGRAMMATIC SECTION 4(F) DOCUMENTATION STANDARDS (APPENDICIES)

Ms. Diana Schulze, P.E.

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November 24, 2021

6. Images of the site where the historic bridge would be relocated.
  - a. See attached photo.
7. A cost estimate for rehabilitation of the bridge into an existing site.
  - a. Design: \$30,000
  - b. Construction: \$100,000.
8. What will be your funding source?
  - a. Bastrop County Precinct 4 Road and Bridge Funds.
9. If necessary, how do you plan to address lead paint on the bridge?
  - a. The 12/7/2015 TXDOT inspection report states that the superstructure (trusses and floor beams) paint system is in relatively good condition, and that the structure was recently painted. It is therefore assumed that TXDOT has removed any lead paint from this structure.
10. Estimated time necessary for rehabilitation and/or estimated time before the bridge will be put into reuse, if storing the bridge. If the project is phased, discuss the steps in each phase.
  - a. See response to Question 4. Except for some truss lower chord areas and connections, the steel superstructure is in generally good condition so the relocated truss and floor beams are planned to be set at the new site in conjunction with the relocation. The planned use of the bridge is light pedestrian traffic.
11. Statement indicating willingness to:
  - a. Accept title to (Ownership of) the bridge.
  - b. Sign maintenance and rehabilitation agreements (see attached sample agreement).
  - c. Assume all legal and financial responsibility for the bridge.
  - d. Hold TXDOT and FHWA harmless in any liability action

Bastrop County is willing to meet the conditions of Items 11) a-d above.

Thank you for your consideration. Please contact me with any questions.

Sincerely,



Robert Pugh, PE, MBA, CFM, ENV SP – Director

Cc: Donna Snowden, Precinct 4 Commissioner, Bastrop County  
Leon Scaife, Purchasing Director, Bastrop County

## APPENDIX F

### Additional Resources (Note: Links Accurate as of November 2022)

#### Regulations, Policies, and Guidance Related to Section 4(f) Requirements

Department of Transportation Act Section 4(f) (23 CFR 774)  
<https://www.ecfr.gov/current/title-23/chapter-I/subchapter-H/part-774>

The FHWA's Environmental Review Toolkit website provides information on and links to various regulations, policies, and guidance related to Section 4(f) requirements. See <https://www.environment.fhwa.dot.gov/legislation/section4f.aspx> for the following policies and guidance:

- FHWA's Section 4(f) Policy Paper
- FHWA's Guidance for Preparing and Processing Environmental and Section 4(f) Documents
- FHWA's Programmatic Section 4(f) Evaluation and Approval for FHWA Projects that Necessitate the Use of Historic Bridges

National Environmental Policy Act (42 USC 55§4321)  
<https://www.epa.gov/nepa/what-national-environmental-policy-act>

The National Historic Preservation Act Section 106 (36 CFR 800)  
<https://www.achp.gov/>

Checklist for Section 4(f) Programmatic Evaluation of Historic Bridge Projects:  
<https://ftp.txdot.gov/pub/txdot-info/env/toolkit/812-01-chk.docx>

#### Regulations, Policies, and Guidance Related to Historic Bridges

The TxDOT Historic Resources Toolkit website provides information on and links to various guidance and information about and historic roads and historic bridges. See <https://www.txdot.gov/business/resources/environmental/compliance-toolkits/historic-resources.html> for the following information:

Historic Road Infrastructure of Texas, 1866-1965: NRHP Multiple Property Form  
<https://ftp.txdot.gov/pub/txdot-info/env/toolkit/420-13-gui.pdf>

Environmental Guidance: Historic Bridge Legacy Program and Public

#### Outreach

<https://ftp.txdot.gov/pub/txdot-info/env/toolkit/423-02-gui.pdf>

TxDOT's Historic Bridge Legacy Program Fact Sheet  
<http://ftp.dot.state.tx.us/pub/txdot-info/env/historic-bridges/faq.pdf>

Template: Historic Bridge Adoption Media Advisory  
<https://ftp.txdot.gov/pub/txdot-info/env/toolkit/423-01-tem.docx>

Template: Historic Bridge Adoption Public Service Announcement  
<https://ftp.txdot.gov/pub/txdot-info/env/toolkit/423-02-tem.docx>

Template: Adopting Historic Bridge Flyer  
<https://ftp.txdot.gov/pub/txdot-info/env/toolkit/423-04-tem.docx>

Template: Historic Bridge Adoption Information Packet  
<https://ftp.txdot.gov/pub/txdot-info/env/toolkit/423-03-tem.docx>

The TxDOT Historic Bridge Owner's website provides tools and information for historic bridge owners. See <https://www.txdot.gov/about/campaigns-outreach/texas-historic-bridges/historic-bridge-owners.html> for the following information:

Historic Bridge Manual  
<http://onlinemanuals.txdot.gov/txdotmanuals/his/his.pdf>

Historic Bridge Legacy Program  
<https://www.txdot.gov/about/campaigns-outreach/texas-historic-bridges/adopt-a-historic-bridge.html>

Highway Bridge Program  
<https://www.txdot.gov/business/grants-and-funding/highway-bridge-program-hbp-federal-aid.html>

TxDOT's Historic Bridge Research and Documentation Guide (how to research the history of a bridge)  
<https://ftp.txdot.gov/pub/txdot-info/env/toolkit/420-08-gui.pdf>

TxDOT's Beyond the Road campaign website  
<https://www.txdot.gov/about/campaigns-outreach/beyond-the-road-campaign.html>



